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and Sara Clavero

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Bridging Divides in The Twin Transition: Governance for Equity and Inclusion

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Abstract

This thematic issue critically engages with the complexities and challenges of the governance of the twin transition through the lens of inclusion and social justice. Scholars and practitioners from Belgium, Ireland, Portugal, Spain, Sweden, and Taiwan examine the origins, determinants, and dynamics of inequalities associated with the twin transition process across different contexts and policy domains. The contributions highlight key governance challenges, identify emerging forms of vulnerability, and bring into focus opportunities to ensure that no one is left behind in the ongoing technological and sustainable transformation.

Keywords

climate change; digitalization; governance; inclusion; social justice; sustainability; twin transition; vulnerability

1. Introduction

The transition towards more sustainable, efficient, and resilient societies is a shared priority of the European Union and the United Nations Sustainable Development Goals (European Commission, 2022; United Nations, n.d.a). By reducing greenhouse gas emissions, transitioning to clean and renewable energy sources, and progressively digitizing services, the overall ambition is to make global economic systems more resource-efficient, mitigate climate change and environmental degradation, and protect the planet and its people (European Commission, n.d.; European Environment Agency, 2026).

While the ambitious targets of green and digital convergence are expected to foster economic growth and promote new sustainable mindsets (Barbero et al., 2025; Blüm, 2022), they also require systemic changes in

public governance approaches to the use of natural and energy resources, relationships among national actors, the private sector and civil society, the transformation of economic structures, and the development of social innovation (UNDP, 2023). As this disruptive transition unfolds globally through the deployment of electric vehicles, solar panels, and platform economies, among other examples of twin transformation, it is increasingly important to address the unexpected social paradoxes associated with this process. Technology-led innovative processes are complex and multidisciplinary social phenomena that entail changes to the status quo and trigger transformations in economic, institutional, and behavioural patterns (Kochetkov, 2023). Although many of these changes generate positive economic impacts and contribute to social progress (Koç et al., 2026), the spillover effects of innovative transformation can also produce social inequalities and marginalization (Aghion & Griffith, 2024).

As some people significantly benefit from the synergies between new digital dynamics and enhanced sustainability standards, others face increasing challenges in adapting to the new status quo. This raises important scholarly debates about the need to prioritize principles of distributive and procedural justice, digital rights, and sustainability equity (Anttiroiko & De Jong, 2021; Haque et al., 2026; Seifi & Crowther, 2024). A lack of skills, the unaffordability of resources, and/or limited access to digital technologies can de facto exclude people from the benefits of digital and green innovation (United Nations, n.d.b; van Deursen & van Dijk, 2019). At the same time, scholars increasingly highlight the compounded effects of the transition process on structural vulnerability, identifying older people, people with disabilities, people experiencing economic distress, migrants, and people living in rural areas among the cohorts most negatively affected by the twin transition (Kolotouchkina et al., 2023, 2024; McDowall et al., 2023; Timmermans et al., 2023). Job losses associated with the phasing out of fossil fuel-intensive industries, regional disparities, the cost burden of accessing innovation, the digital divide, and energy and transport poverty are among the negative outcomes of the twin transition experienced by vulnerable populations (Al Kez et al., 2024; Mejía Dorantes & Murauskaite-Bull, 2023). Furthermore, gender is an important dimension of these inequalities, shaping both exposure to the risks of the twin transition and access to its benefits, through differences in employment, income, digital skills and access to technology, as well as the unequal distribution of unpaid care and household responsibilities. It intersects with other inequalities such as socioeconomic status, age, disability, ethnicity, migration status, and territorial location, thus compounding existing disadvantages (Anjum & Aziz, 2025; Johnson et al., 2020; Walk, 2024).

Ultimately, the negative impacts of the twin transition on social inequalities and vulnerabilities can further widen the rift between citizens and public institutions, undermining levels of trust and engagement in this transformative process (Piqueiras & Canel, 2021; Piqueiras & Luoma-aho, 2025). Therefore, the governance of the twin transition needs to incorporate a thorough understanding of the potential risks and critical hazards associated with this process, as well as the profiles and intersecting dimensions of structural and compounded vulnerabilities. It should also be guided by universal principles of social justice throughout policymaking and implementation.

2. Overview of Authors' Contributions

The contributions to this thematic issue critically engage with the complexities and challenges of governing the twin transition through the lens of inclusion and social justice. Scholars and practitioners from Belgium, Ireland, Portugal, Spain, Sweden, and Taiwan examine the origins, determinants, and dynamics of inequalities

associated with the green and digital convergence, highlighting key governance challenges, emerging forms of vulnerability, and opportunities to ensure that no one is left behind in the technological and sustainable transformation.

The authors place particular emphasis on vulnerability and inequalities in the context of systemic green and digital transformation, focusing on their underlying determinants and structural conditions. Erridge et al. (2026) explore the meaning of vulnerability in the context of the green transition in the European Union and identify emerging vulnerabilities arising from the reproduction of intersectional socio-environmental inequalities. Drawing on six case studies, the authors analyse the socio-environmental and economic impacts of the green transition across different policy areas and multiple countries in Southern and Eastern Europe. Their findings reveal that green policies aimed at addressing climate change can generate green sacrifice zones, (re)vulnerabilize marginalized populations, and reinforce persistent inequalities.

In parallel, Svenberg et al. (2026) argue that the twin transition brings profound transformations in socio-economic and socio-technical relations that can simultaneously mitigate and intensify existing inequalities. From this perspective, vulnerability cannot be understood as an attribute of predefined groups but rather as a relational and processual condition emerging through the political, infrastructural, territorial, and network effects of twin transition implementation. Through an analysis of the conceptual barriers that limit how vulnerability is understood in twin transition governance, the authors reveal how vulnerability is experienced, negotiated, and reconfigured in everyday life.

The focus on potential determinants and drivers of exclusion as a key principle of a just and fair twin transition is addressed by Arias Astray et al. (2026), who develop six prototypical profiles of structural inequalities across the sectors of urban mobility, the platform economy, digital administration, energy, agriculture, and housing. Through a comparative analysis of sectoral inequalities, the authors identify the upfront cost barrier, the digital divide, the geographic penalty, and knowledge disqualification as recurring structural mechanisms of exclusion in the twin transition process, potentially leading to institutional disaffection and political radicalization.

Specific vulnerable groups, including people with disabilities, older people, and migrants and refugees who face discrimination and/or marginalization in the context of the twin transition, are also prominent in this thematic issue. Tsai (2026) examines the determinants of the digital divide and digital exclusion in the context of higher education and disability status, drawing on Taiwan's Digital Access Survey. While education emerges as a strong driver of digital inclusion, the author highlights how inaccessible environments and structural inequalities embedded within social systems hinder the distributive justice of digital benefits for people with disabilities and emphasizes the need to pay greater attention to the structural conditions underlying inequalities.

The intersection of climate change, migration, and social justice is examined by Parra Ferreras and Hänninen (2026) in the context of the climate emergency and human migration flows at the Southern border of Europe. Their study focuses on Spanish media narratives surrounding environmental crises, climate refugees, and the marginal coverage of human trafficking networks. The findings reveal that the press fails to provide structural accounts of these issues by decontextualizing migration flows into remote scenarios, systematically evading corporate responsibility, trivializing climate mobility in non-hard news sections, and prioritizing institutional voices over migrants' lived experiences. Consequently, the authors raise concerns about prevailing media and

bureaucratic ethics that sidestep debates surrounding historical reparations, financial justice, and the reform of international protection frameworks.

Campillo-Alhama and Mateo-Perez (2026) examine communicative exclusion as a specific form of institutional inequality affecting older people in the context of digital transition. Emphasizing the importance of citizen engagement and participatory governance for ensuring effective inclusion and procedural justice, the authors develop a model of inclusive communication observatories as participatory and evaluative infrastructures for municipal communication processes and inclusive governance.

The critical importance of anticipatory governance, scenario planning, and evidence-based decision-making is addressed in two final contributions to this thematic issue. Armayones Carranza and Viñé Rius (2026) examine the governance of Europe's twin transition. Focusing on the FITTER-EU project across four key sectors in six EU countries, the authors highlight the necessity of integrating vulnerability and social inclusion directly into foresight processes rather than relying on reactive ex-post compensation. By embedding just transition considerations as structural design criteria, their approach generates different 2050 exploratory scenario configurations. Ultimately, this provides policymakers with mechanisms to support anticipatory and evidence-informed decision-making.

Finally, Nguyen (2026) examines the dimension of justice in the context of Vietnam's governance of the green and digital transition. Through an analysis of key policy documents, leadership speeches, and expert interviews, the study finds that, while governance of the green transition is slightly more vulnerability-sensitive than that of the digital transition, both ultimately follow similar structural patterns: diluting the recognition of specific vulnerabilities, distributing benefits to already advantaged actors, and limiting participation to passive or symbolic forms. Building on these findings, the author proposes the concept of parallel transformation, an alternative to the twin transition model, showing that shared structural constraints, rather than coordination, drive both transformations toward similarly limited justice outcomes.

We hope that this thematic issue will make a meaningful academic contribution to advancing research on the complexities and governance challenges of the twin transition and encourage further scholarly debate on how to ensure that this process is genuinely fair, inclusive, and just for all.

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We would like to thank all the authors for their dedication to showcasing research that reveals the complexities of the twin transition governance through the lenses of social and environmental justice, digital, and social inclusion. We also wish to express our sincere gratitude to the editorial team of *Politics and Governance* for their commitment to this important and timely thematic issue. We extend our particular gratitude to the reviewers for their dedicated support, invaluable expertise, and the considerable time they invested in providing thoughtful and constructive feedback on the submitted manuscripts. Their contributions have been instrumental in strengthening the quality of the research presented in this thematic issue.

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Conflict of Interests

The authors declare no conflict of interests.

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Social Impacts of the Green Transition: Prospective Environmental (In)Justice in Europe's Peripheries

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Abstract

The green transition is increasingly perceived as unjust by various stakeholders. Academic debates revolve around decarbonisation and coal phase-out legislation, the rush for critical minerals, new forms of renewable energy, regional strategies and the lack of effective coordination mechanisms, and policy gaps between economic and workforce development strategies and socio-ecological protections. Based on six case studies carried out between 2023 and 2025, this article identifies future vulnerabilities arising from the reproduction of intersectional socio-environmental inequalities in the EU's just transition, thereby expanding the frame of socio-environmental justice (SEJ) through the lens of prospective environmental justice (PEJ). By centring analysis on the prospective production of SEJ and creation of green sacrifice zones, PEJ encourages scholarship and policy to confront the cross-sectoral and structural inequalities that green transition policies, as expressions of green capitalism, often inherit and amplify. We address a gap in comparative studies that empirically and qualitatively engage with the grassroots effects of the transition in Southern and Eastern Europe, discussing its structural conditions and evidencing place-based lived experiences. This article contributes to mapping prospective (re)vulnerabilisation in Europe's green/just transition and the making of green sacrifice zones, wherein certain groups, identities, lands, and livelihoods are precast as dispensable in the pursuit of climate goals. Our contribution builds understanding of what it means to be made vulnerable in the technocratic shadow of the green transition in Europe's periphery.

Keywords

green sacrifice zones; just transition; prospective environmental justice; socioeconomic inequalities; socio-environmental justice; vulnerability

1. Introduction

The twin transition (digital and green), unfolding amid the triple planetary crisis (climate change, nature loss, and pollution), is a “complex policy-led process with time goals” (Garcia-Garcia et al., 2020, p. 1) that aims to: reduce greenhouse gas emissions by 55% by 2030, reach 40% renewables by 2040, and attain climate neutrality by 2050 under the European Green Deal’s Fit for 55 package (2020). Under the framework of a just transition that “leaves no one behind,” major policy changes and innovations have occurred in strategic sectors, including energy and renewables, industrial decarbonisation, transportation and housing, finance, agriculture, food systems, and biodiversity. The cumulative effects of these policies are stimulating a growing academic debate around how best to evaluate the fairness and effectiveness of their driving mechanisms, as well as their socioeconomic and environmental impacts (Krawchenko & Gordon, 2021; Lager et al., 2023; Millward-Hopkins & Johnson, 2023; Sovacool et al., 2020). Drawing on environmental justice and political ecology literature, this article contributes to the debate by examining how patterns of socio-environmental injustice are reproduced through the planning and implementation of just transition policies in peripheral European regions. It addresses the green transition through the multidimensional lens of prospective environmental justice (PEJ; Velicu, 2020).

The socio-environmental justice (SEJ) framework has been adopted by movements, politicians, and scholars to identify and critically analyse the multiple forms of violence, power dynamics, vulnerabilisation, and (re)production of inequalities involved in the planning and implementation of green transition policies, with a specific focus on the lived experiences of affected communities (Cambou, 2020; Middlemiss, 2022; Sanz-Hernández et al., 2020; Svartdal & Kristoffersen, 2023; Upham et al., 2022). Five dimensions of SEJ operate at the core of policy planning and implementation (distributional, procedural, recognitional, restorative, and cosmopolitan), exposing negative effects and procedural shortcomings. This, in turn, requires a just transition capable of compensating for the material and immaterial harms caused by including and recognising marginalised groups in decision-making processes that concern their territories, livelihoods, and futures (Lager et al., 2023). And yet, Velicu and Barca (2020, p. 265) emphasise the need to go beyond an understanding of SEJ as (only) “the unfair distribution of toxins or benefits,” arguing instead for more analysis “to examine everyday social relations of injustices as they indicate preliminary problems.” What is needed is an analysis that addresses SEJ in its targeted, deliberative, and ongoing processes of (re)vulnerabilisation and sacrificial gerrymandering in the name of global green citizenship.

Contributing to fill this gap, this article addresses one broad question: *How are socio-environmental injustices prospectively produced across green transition policy domains?* This question is answered through the critical perspective of PEJ (Triefus & Velicu, 2025; Velicu, 2020; Velicu et al., 2026). PEJ is an understudied concept within the just transition framework that offers an analytical tool to push our thinking about socio-environmental justice beyond procedural dimensions of distribution, recognition, or participation (Velicu & Kaika, 2017) by addressing the preliminary “slow, discursive, symbolic, agentic, psychological, spatial, temporal, material layers of violence associated with economic growth” (Velicu, 2020, p. 8). PEJ examines how vulnerabilisation is reproduced and projected into the future. It builds on existing efforts to map vulnerability across the EU, as a transversal analytical lens that cuts across the five dimensions of SEJ to identify the pre-emptive nature and ongoing production of sacrificable zones and groups on the altar of the green transition (Zografos & Robbins, 2020). We apply the PEJ lens to understand inequalities not as outcomes, but as ex-ante instances that can be either amplified or diminished by decarbonisation policies

(Dwarkasing, 2023). In this context, vulnerability is continuously produced within “relationships of domination and oppression that are shaped by the social, economic, and political cultures, structures, and processes that constitute political life,” whose uneven distribution should be considered as systemic (Schiff, 2024, p. 126).

Several indexes, indicators, datasets, and studies attempt to measure widespread societal vulnerability related to climate change and the green transition, in largely quantitative terms, such as the European Environment Agency’s Climate Change Vulnerability Impact Assessment, the European Committee of the Regions Territorial Impact Assessment, the EU Energy Poverty Advisory Hub, the EU Multidimensional Inequality Monitoring Framework, and the Regional Green Transition Vulnerability Index (Antje et al., 2023; Juhola et al., 2022; Lager et al., 2023; Rodríguez-Pose & Bartalucci, 2024; Sánchez-Guevara et al., 2019; Sibilia et al., 2024). In broad terms, Zarowsky et al. (2013) outline “shadow zones of vulnerability” and processes of vulnerabilisation in a public health context, identifying three core elements: (a) the initial or underlying condition of the affected individuals or groups; (a) exposure to individual or collective risks or shocks; and (c) their capacity to cope with these risks and their consequences. For regions highly dependent on carbon-intensive industries and sites of potential and existing EU Strategic Project designation, or related to Important Projects of Common European Interest, different dimensions of SEJ in the literature contain precursive temporalities, where energy poverty, housing inequality, and job precarity exist and can be exacerbated. A PEJ lens helps understand pre-emptive processes of (re)vulnerabilisation in a just transition, in order to scrutinise and ultimately better prepare to mitigate socio-environmental injustices, by identifying five processes of PEJ that crosscut the five dimensions of SEJ, which we unpack in Section 2.

Using data from six methodologically diverse case studies aligned through a common analytical framework (see Section 3), this article conducts a cross-sectoral analysis of their preliminary results through the lens of PEJ. These cases investigate the socio-environmental and economic impacts of the green transition in different policy areas and multiple countries across Southern and Eastern Europe. In particular, they focus on lithium mining in Portugal (Barroso) and Serbia (Avramović et al., 2025; Piccardi et al., 2025), forest conservation in the Carpathians, Romania (Puiulet et al., 2025), coal mine closures in the region of Bierzo-Laciana, Spain (Zavala Pérez, 2025), agricultural land use in Croatia, Serbia, and Slovenia (Pistotnik & Kušej, 2025), and energy renewal of residential buildings in Croatia, Serbia, and Slovenia (Komazlić et al., 2025). Together, these studies encompass (at least) five major EU decarbonisation and green transition policy domains, and their diverse contexts enable us to avoid sectoral reductionism. This article contributes to understanding the prospective (re)production of vulnerability in Europe’s green transition and the making of new green sacrifice zones, where certain groups, lands, and livelihoods are pre-emptively cast as dispensable in the pursuit of both new extractivism and climate goals (Juskus, 2023; Marin et al., 2023; Saleth & Varov, 2023; Zografos & Robbins, 2020).

This article is structured as follows: the next section provides a general overview of current efforts to map vulnerability and SEJ studies on green and just transition impacts, with a focus on PEJ and consequent visions of mitigating, not exploiting, vulnerability and (in)equality. Section 3 outlines the GreenPaths analytical framework adopted by the six case studies and the methodology mobilised by the present article to analyse them. Section 4 presents the main results deriving from PEJ cross-case analysis, and, before concluding our findings, Section 5 offers a brief discussion on policy implications of PEJ and future directions.

2. Prospective Environmental Injustice and the (Re)Production of Vulnerabilities in the Green Transition

Environmental justice literature offers five established dimensions for analysing the uneven impacts of green transition policies: procedural, distributional, recognitional, cosmopolitan, and restorative. Distributional justice, the most referenced, relates to how different groups benefit or experience impacts from the changes associated with the green transition (Köhler et al., 2019; Krawchenko & Gordon, 2021; Millward-Hopkins & Johnson, 2023; Piggot et al., 2019; Sovacool et al., 2020). The authors highlight that this should entail a renegotiation and assessment of distributional patterns of costs and benefits. Procedural justice focuses on governance elements—who is included in decision-making and how decisions are made (see Cambou, 2020; Heffron & De Fontenelle, 2023; Krawchenko & Gordon, 2021; Lager et al., 2023)—and requires policy tools that facilitate genuine discourse and contestation, wherein the just transition is not seen as a one-off event, “a passage to a predefined future, but a set of continuously evolving processes that must be responsive to diverse forms of vulnerabilities and the relational practices that condition them” (Abram et al., 2022, p. 1038). Recognitional justice sheds light on which groups are vulnerable, marginalised, misrepresented, or silenced within transition processes (Juhola et al., 2022; Krawchenko & Gordon, 2021; Lager et al., 2023; Lempinen & Vainio, 2022). The dimensions least encountered in the literature are restorative justice—compensation for and the mitigation of the loss and damage brought on by the transition (Lempinen & Vainio, 2022; McCauley et al., 2023)—and cosmopolitan justice, rooted in the notion that the citizens of each nation have an obligation to themselves and to citizens of other nations (Heffron & De Fontenelle, 2023; Sovacool et al., 2020).

Some national studies offer diverse insights into just transition policy’s adverse impacts on SEJ. For example, Lempinen and Vainio’s (2022) study of Finnish peat workers’ experiences of transition policies unpacks cosmopolitan, distributive, procedural, restorative, and recognition injustices, citing concerns for the future “saturated with profound personal and economic worry” (Lempinen & Vainio, 2022, p. 6). Upham et al. (2022) explored energy and transport poverty in Iceland, focusing on disability and vulnerability as access barriers to social benefits, identifying sociodemographic characteristics of those likely to experience deprivation—people in isolated rural locations, single parents, those without access to a car, etc. In Norway, Svartdal and Kristoffersen’s (2023) introduce the Why in My Backyard (WIMBY) framework to capture local perceptions of energy projects and the “technological, social, and cultural factors that shape public attitudes and engagement” (Svartdal & Kristoffersen, 2023, p. 7). Cambou (2020) focuses on Indigenous Sami rights to reindeer husbandry, guaranteed in Sweden’s green transition policy, yet impacted by wind turbine construction, detailing examples of distributional, procedural, and recognitional injustice under domestic and international human rights and environmental law.

While these SEJ categories capture prominent ongoing harms, they often remain within a framework that addresses injustices as they manifest—on impact—necessitating interrogation of the deeper structural conditions that produce them (Cedergren et al., 2022; Lager et al., 2023). To address this, we adopt PEJ as an analytical lens to help understand the “deep-seated and ongoing dimensions of socio-environmental injustice” that are often overlooked—forms of harm that can be understood as “constitutive moments of systemic violence” (Velicu, 2020, p. 414). The concept draws attention to the pre-emptive structural aspects of SEJ that are exploited and normalised by global capitalism, and to the racialised, patriarchal, and militarised patterns of control over resources (Pichler et al., 2017; Pulido, 2017). At its core, PEJ asks what

makes “extractivist projects possible in the first place” (Velicu, 2020, p. 414)—the pre-existing forms of violence that pave the way for, and are subsequently reinforced by, green development projects that aim to promote what Dunlap and Riquito (2023, p. 18) call “a hyper-modernist worldview based on climate reductionism and techno-fixes.” Velicu (2020) identifies five interrelated processes of PEJ evident in affected communities’ testimonies: (a) slow dispossession and forced marginalisation of communities; (b) the production of disposable lives and livelihoods; (c) daily psychological and emotional damage; (d) the systematic disavowal of alternatives to development; and (e) the disqualification of communities as political subjects. Across these processes, disproportionate harm is not merely a failure of distribution or recognition, but “the exact production of some people and spaces as dispensable or ‘surplus’” (Triefus & Velicu, 2025; Velicu, 2020, p. 11) that precedes any formal decision.

This critical perspective directly informs a more radical interrogation of the just transition framework. As Velicu and Barca (2020) argue, where just transition vocabularies have expanded to include representation and participation, vulnerable people are essentially invited to accept compensation from a system that thrives on producing such groups, trapping justice in a limiting, techno-managerial politics. By centring analysis on the prospective production of injustice—the making of disposable people before a project even begins—PEJ challenges just transition scholarship and policy to confront the structural inequalities and vulnerabilities that green transition policies, as expressions of green capitalism, risk reinforcing when they fail to interrogate the pre-existing conditions that make certain communities more exposed, vulnerable, and at risk.

This framing responds to important gaps in the existing literature. Scholars have documented that climate policies often generate new social risks for the most vulnerable, including poor and Indigenous communities displaced through green land grabs for lithium, biofuel production, and renewable energy infrastructure (Carley & Konisky, 2020; Sovacool, 2021). As Piggot et al. (2019) highlight, fossil fuel divestment planning tends to focus more narrowly on compensation rather than on wider social equality concerns, which raises critical questions regarding how transition planning can account for non-financial losses, such as loss of culture or identity. Intersectional analyses further reveal how low-income households, people with disabilities, single mothers, and ethnic minorities face the transition at a systematic disadvantage (Middlemiss, 2022). We develop this research on PEJ in the context of the UN Warsaw International Mechanism on Loss and Damage (2013), which calls for non-economic loss to be factored into mitigation and adaptation policy in line with Article 8 of the Paris Agreement (decision 2/CP.19).

Crucially, the limited evidence on new forms of SEJ in Europe remains concentrated on Western Europe, omitting populations in Southern and Eastern Europe already made vulnerable by post-socialist transitions (Golubchikov & O’Sullivan, 2020). As Rodríguez-Pose and Bartalucci (2024) demonstrate, less developed, peri-urban, and rural regions in both Southern and Eastern Europe are significantly more exposed to green transition socio-economic reconfigurations, with vulnerability correlated to lower regional GDP per capita. In Central and Eastern Europe, structural determinants—cold climates, inefficient dwellings, decaying infrastructure, and high income inequality—intersect with heavy reliance on coal-fired power stations and rising energy poverty to create distinct vulnerabilities (Middlemiss, 2022; Voicu-Dorobanțu et al., 2021). Southern European regions face compounded challenges, including reliance on tourism and agriculture—sectors set for major disruption—alongside pre-existing economic stagnation (Avramović et al., 2025; Rodríguez-Pose & Bartalucci, 2024). As Schuster et al. (2023) show, wide disparities exist even among EU

member states. For example, while Germany implements programmes for local diversification and support for ethnic minorities, Romania has largely lacked interest in managing a just transition, leaving already marginalised communities further exposed.

Our contribution grounds PEJ as a way to understand what it means to be (re)vulnerabilised in the techno-solutionist shadow of the green transition. As Tansel and Tilley (2024, p. 523) remark: “the race to make Europe ‘the first climate-neutral continent’ by means of the European Green Deal hinges on making (or re-making) colonial territories into sacrifice zones for the extraction of transition minerals.” This thinking highlights a key dichotomy of cosmopolitan injustice that, on one hand, depicts the transition as a planetary good with common global-community goals, whilst on the other hand, creates green divides in the attribution of benefits and displacement of socioeconomic and ecological costs onto vulnerable populations. By applying a PEJ lens to under-researched geographies, this article contributes to mapping the prospective production of vulnerability in Europe’s green transition and the making of new green sacrifice zones (Marin et al., 2023; Zografos & Robbins, 2020). Through this lens, we build on SEJ literature in relation to Tansel and Tilley’s (2024, p. 523) call to “critically reframe such large-scale transition projects and their concrete impact on the conditions of existence for many marginalised and vulnerable communities.”

3. Methodology

The literature reviewed in Section 2 builds on a scoping review conducted between November 2023 and February 2024 regarding policy impacts and discussions on green transition in Europe, through an initial scan in Google Scholar, a systematic search in Mendeley, and a systematic search in the EU publications database (Chavez et al., 2024). Additional literature was reviewed between October 2025 and February 2026, searched through Google Scholar, and expanded on gaps relating to keywords of vulnerability, SEJ, and green sacrifice zones in the EU context.

The empirical and secondary data presented in this article were generated through research of the GreenPaths project, whose case studies investigated the same overarching question (How are green transition policies impacting environmental sustainability and social wellbeing?). This article focuses on further data analysis and discussion in response to two specific research questions: How are socio-environmental injustices prospectively produced across green transition policy domains? What can a PEJ framework contribute to understanding (re)vulnerabilisation beyond standard SEJ dimensions? The purpose of the case studies was to provide a comprehensive, in-depth, and empirically grounded assessment of the linkages between green transition policy interventions, environmental sustainability, and social wellbeing. GreenPaths’ 15 case studies were selected based on three main criteria: (a) relevance to European Green Deal-related policy interventions; (b) geographical focus on regions often underrepresented in transition debates; and (c) availability of in-depth empirical material generated within the project. More specifically, in this article we selected six focus case studies based on overlapping themes of the project’s analytical framework (see Figure 1), geographic focus on Southern and Eastern Europe, transnational policy connections, and the authors’ varying degrees of involvement as co-authors (Piccardi et al., 2025; Puiulet et al., 2025) or as advisors and peer-reviewers (Avramović et al., 2025; Komazlić et al., 2025; Pistotnik & Kušej, 2025; Zavala Pérez, 2025).

The methods used across the case studies are diverse, consisting of: literature reviews; media, legal, and policy content and critical discourse analysis; quantitative data analysis; primary qualitative data analysis from interviews, focus groups, ethnography, participant observation, public and online events, seminars, webinars, conferences, consultations, and debates with policy and legal experts, researchers, government officials, trade unionists, activists, and local residents. To ensure analytical coherence, all case studies were guided by a common analytical framework and a conceptual and methodological matrix that established cross-sectoral and transversal processes of social impact and common scientific concepts that set parameters, provided a common lexicon and a toolbox of indicators and methodological tools (Erridge et al., 2024). As shown in Figure 1, the framework proposes three connected conceptual tiers: overarching concepts that align the case studies across multiple contexts; specific, industry or discipline-focused fields of inquiry; and localised, case-specific concepts. While this diversity strengthens the empirical base, it also limits strict comparability across cases. Accordingly, our approach does not aim at direct comparison nor monitoring and evaluation-style policy appraisal, but at identifying recurring patterns and mechanisms across heterogeneous contexts.

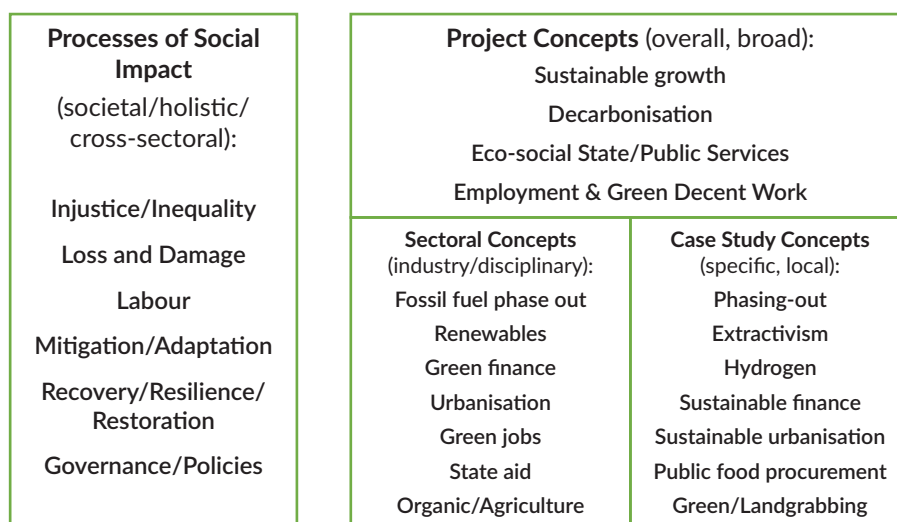


Figure 1. GreenPaths analytical framework: Key concepts and social impacts (Erridge et al., 2024).

The study followed a thematic analysis approach (Braun & Clarke, 2021), adapted to a multi-case comparative design. It focused first on the summary socioeconomic and environmental costs and benefits of green transition policy as identified by partners in their cases, analysing secondary data produced as part of a synthesis of case study findings (Clifton et al., 2025) and enriched by additional analysis of empirical data through our PEJ lens. First, deploying MAXQDA software, we developed a hybrid coding scheme, combining deductive codes derived from the GreenPaths analytical framework with inductive codes emerging from the empirical material. Second, consistent with Braun and Clarke's (2021) phases of thematic analysis, codes were grouped into themes through a process of pattern identification across cases, which were then reviewed and refined in relation to our additional research question and PEJ focus. The analysis focused on recurring "meta-narratives" around the winners and losers of green transition policy and structural mechanisms through which SEJ/PEJ is produced, and patterns of inequality and vulnerability are (re)generated across policy domains and geographical contexts (Clifton et al., 2025).

Finally, several methodological limitations must be acknowledged. These include potential selection bias due to case availability within the project, authorship of cases, and the limited generalisability of findings beyond the studied contexts. These limitations are mitigated through the use of a shared analytical framework, systematic coding procedures, and a transparent cross-case analytical strategy. Table 1 shows an overview of the case studies, identifying the key policy areas, conflicts, and locations.

Table 1. Overview of case studies' focus areas.

Case study authors	Policy area	Key policies analysed	Location (country, place, project)
Piccardi et al. (2025)	Critical raw materials/lithium mining	EU Critical Raw Materials Act (CRMA); National Energy and Climate Plans (NECPs)	Portugal, Barroso, proposed lithium mine
Puiulet et al. (2025)	Biodiversity/forest conservation	EU Biodiversity Strategy (European Green Deal); National Forest policies	Romania, Făgăraș Mountains, eco-park
Zavala Pérez (2025)	Coal phase-out	EU Just Transition Mechanism; Spanish Just Transition Agreements (JTAs)	Spain, Bierzo-Laciana, JTA phase-out region
Pistotnik and Kušej (2025)	Agriculture/land use	EU Common Agricultural Policy (CAP 2023–2027)	Croatia, Serbia, Slovenia, CAP land use
Avramović et al. (2025)	Critical raw materials/lithium Mining	CRMA; NECP	Serbia, Jadar, proposed lithium project
Komazlić et al. (2025)	Energy poverty/building renovation	EU Directive on Energy Performance of Buildings (EPBD); National renovation programs	Croatia, Slovenia and Serbia, urban renewal

4. Mapping Processes of PEJ in Six Case Studies

In this section we provide an overview of the six case studies, analysing them through the PEJ lens to show how socio-environmental injustice is being produced and reproduced. The six case studies are situated in Southern and Eastern Europe, and cover multiple policy areas. We focus on the EU's CRMA and associated NECPs in the case of the proposed lithium mines in Barroso, Northern Portugal, and Jadar, Serbia. Born out of the "lithium rush," the Mina do Barroso project has seen consistent opposition from local communities and reflects "sacrificial logics" at the EU and national policy level, as well as in the mining company's public relations discourse, in which a UN Globally Important Agricultural Heritage System and its communities are rendered expendable for critical mineral extraction (Piccardi et al., 2025). The Jadar case, currently on hold due to grassroots resistance and a lack of necessary permits, acts as a cautionary tale: global demand for critical raw materials can exacerbate local injustices, creating and justifying green sacrifice zones as an acceptable price to pay for EU accession and green technology supply chain optimisation (Avramović et al., 2025).

The EU's biodiversity strategy is present in the case of a controversial forest conservation project led by the Foundation Conservation Carpathia (FCC) in the Făgăraș Mountains, Romania, which has also faced significant opposition from local populations. The Romanian forest conservation case applies the green

sacrifice zone lens to biodiversity conservation, revealing how a neoprotectionist model of conservation facilitates green grabbing that sacrifices local livelihoods (Puiulet et al., 2025). We also discuss the EU Common Agricultural Policy (CAP; 2023–2027) and its impacts in Croatia, Serbia, and Slovenia, which point to the rise of green grabbing as well as the costs of ecological “solutions” for rural communities. The CAP case demonstrates how land is reduced to a technical variable for carbon sequestration and biodiversity offsets, facilitating the reproduction of inequalities through land concentration and the marginalisation of small-scale farmers (Pistotnik & Kušej, 2025).

Sacrificial logics also operate, albeit less explicitly, across the remaining two cases. Looking at socioeconomic initiatives under JTAs, coal phase-out in El Bierzo and Laciana in León (Northern Spain) is visibly affecting local communities through the abrupt closures of mining activities and inadequate compensation mechanisms—“neither *transition* nor *just*” (Zavala Pérez, 2025). The Spanish coal phase-out case suggests that mining communities are treated as expendable in the transition to renewables (Zavala Pérez, 2025). The EU Directive on EPBD is explored in the case of Croatia, Slovenia, and Serbia, which questions the effectiveness of associated national policies to reduce energy poverty. The systematic exclusion of vulnerable households from funding schemes, combined with the gentrification pressures that follow renovation, suggests that low-income tenants and rural communities are being sacrificed for urban, property-owning beneficiaries of the green transition (Komazlić et al., 2025).

Narratives of manufactured urgency are deployed to justify fast-tracking extractive projects, as seen in the case of Barroso, whilst the procedural mechanisms that exclude vulnerable groups from funding are identified in the case of CAP and in the renewal of residential buildings. Recognition failures render traditional conservation practices invisible in the formation of the FCC’s eco-park, whilst discourses that frame local resistance to mining as an obstruction of national development are evident in both the lithium cases, which all function as “constitutive moments of systemic violence” (Velicu, 2020, p. 1). In this sense, our PEJ analysis reveals deeper structural patterns that cannot be captured by the ex-ante characteristics of SEJ dimensions alone. All six case studies reveal recurring patterns through which green transition policies produce and reproduce socio-environmental injustices. Drawing on Velicu’s (2020) original formulation of the five processes of PEJ, in the following subsections we uncover the deeper processes of (re)vulnerabilisation underpinning SEJ in the green transition.

4.1. *Slow Dispossession and Forced Marginalisation of Communities*

Across these cases, we observe the systematic production of vulnerability through slow dispossession and forced marginalisation: tactics that pressure communities into accepting extraction or conservation whilst acclimatising them to insecure futures (Velicu, 2020). In Romania, Puiulet et al.’s (2025) examination of forest conservation in the Făgăraş Mountains reveals how the creation of a large privately-owned conservation area has restricted access to forests, traditionally used for husbandry, timber collection, and foraging, with impacts disproportionately felt by the most vulnerable, such as the Roma community, who have seen dramatic declines in income from mushroom picking. New financial ventures like the Carpathia Carbon Finance Project risk further alienating locals from potential benefits (Puiulet et al., 2025). In the Portuguese lithium case, the combination of manufactured urgency, tick-box consultation, and government-facilitated processes of (private and commons) land expropriation serves to pressure communities to accept mining whilst denying their “right to say no” (Piccardi et al., 2025). The energy renovation case reveals how the

exclusion of vulnerable households from funding schemes facilitates “renoviction” (Komazlić et al., 2025). This active production of displacement as energy efficiency upgrades drive “green gentrification” and rising rents. Funding processes fail to identify and subsidise vulnerable tenants in multi-apartment buildings. At the heart of this is the “split incentive” or “landlord–tenant dilemma,” since property owners lack motivation to invest in energy upgrades, whilst tenants cannot make such investments themselves (Komazlić et al., 2025). Slow dispossession of rural communities also appears as a consequence of CAP, whose implementation across Slovenia, Croatia, and Serbia reveals how direct payments reinforce land concentration and consolidate power among large actors, while smallholder farmers, women, and youth face systematic exclusion from benefits (Pistotnik & Kušej, 2025).

4.2. The Production of Disposable Lives and Livelihoods

What we observe across all six cases is the preordained (re)production of certain groups, lands, and livelihoods as sacrificial as a process of (re)vulnerabilisation that precedes and enables specific injustices. The pre-emptive production of certain populations as “dispensable,” which manifests as subsistence economies are threatened, people are acclimatised to precarity and constituted as surplus to the requirements of green modernisation (Velicu, 2020, p. 11). In the energy renovation case across Croatia, Serbia, and Slovenia, Komazlić et al. (2025) found that the most vulnerable households—elderly residents, single parents, tenants of post-socialist housing, or rural communities reliant on solid fuels—remain largely excluded from funding schemes, whereas more affluent urban households benefit from state and municipal programmes, creating a “twofold territorial bias” favouring urban over rural areas and affluent neighbourhoods over disadvantaged ones (Komazlić et al., 2025). In Serbia, Rio Tinto’s Jadar project, studied by Avramović et al. (2025), threatens irreversible ecological damage to fertile agricultural regions and endangered biodiversity habitats, whilst Piccardi et al. (2025) show that Savannah Resources’ Mina do Barroso project in Northern Portugal threatens contamination of air and water resources vital for local subsistence that could also impact a Natura 2000 biodiversity site. The transition has also engendered labour precarity, evidenced by job losses, regional emigration and insufficient reskilling in “new green” industries (Zavala Pérez, 2025). The Spanish coal phase-out case reveals how distributional injustices manifest inequitable benefits and burdens across groups—adult men most affected by job losses, women entering precarious employment, youth facing bleak prospects (Zavala Pérez, 2025). A recurring tension exists between decarbonisation imperatives and livelihood dependencies. New projects often prioritise temporary, high-skilled employment while displacing pastoral and rural communities, failing to generate sustainable economic alternatives for affected populations. This is compounded by widespread scepticism about the number and quality of jobs that green projects will actually create (Piccardi et al., 2025; Puiulet et al., 2025; Zavala Pérez, 2025).

4.3. Daily Psychological and Emotional Damage

A third key process of PEJ is the daily psychological and emotional damage felt by marginalised local communities. This falls under intangible loss and damage (Tschakert et al., 2019), both in relation to threats to historical livelihoods and in the toll taken by fighting against green capitalist takeover, in protest and in the courts. In the Spanish coal phase-out case, the protracted uncertainty surrounding JTA implementation, constant shifts in policy objectives and bureaucratic obstacles to accessing promised benefits inflict daily psychological and emotional damage: communities are not simply experiencing a transition, but rather a

slow dispossession of secure futures through tactics that erode resistance and shut down meaningful alternatives (Zavala Pérez, 2025). In the case of the Barroso mine, widespread public opposition has generated multiple forms of injustice; these effects are particularly pronounced for women, who are frequently at the forefront of resistance and, due to their historically rooted roles in social reproduction, tend to shoulder a substantial share of the emotional labour involved (Piccardi et al., 2025; see also Dunlap & Riquito, 2023). In Romania, community resistance has been met with public humiliation and threats of legal action, fostering a pervasive climate of fear (Puiulet et al., 2025). A similar pattern is evident in the Jadar lithium mine case, where those who refused to sell their land have reportedly faced intense pressure.

4.4. *The Systematic Disavowal of Alternatives to Development*

This process of PEJ is strongly reflected in the sidelining and erasure of traditional agricultural and nature stewardship practices, even those recognised for their global importance by the UN. In the Romanian forest case, the eco-park project erases local stewardship, invoking “virgin wilderness” narratives that invisibilise centuries of sustainable environmental care work by local communities, framing their ancestral lands as pristine nature to be saved and denying their existence as legitimate political subjects (Puiulet et al., 2025). These colonial tropes of pristine wilderness have long justified dispossession and, today, are recycled to justify green grabbing (Iordăchescu, 2021). The CAP case reveals how gendered injustices persist as women hold significantly less land and access fewer benefits from area-based subsidies, while commons-based alternatives lack serious policy recognition (Pistotnik & Kušej, 2025). When CAP payments reinforce land concentration, they (re)activate structural inequalities that make large-scale industrial farming the only viable model. In both the Romanian and Portuguese cases, traditional systems of communal land governance—the *obște* or *composesorate* in Romania, the *baldios* common lands in Portugal—are minimised and circumnavigated despite their historical and cultural significance (Piccardi et al., 2025; Puiulet et al., 2025).

4.5. *The Disqualification of Communities as Political Subjects*

The last process of PEJ that we discuss is the disqualification of communities as political subjects. In our cases, it manifests in the truncation, acceleration, and exclusion from substantive public consultation on environmental impact assessments around green energy and extraction projects and reliance on non-binding principles over international law (e.g., EU principles for sustainable raw materials; European Commission, 2021). For instance, in the Romanian case, the profound recognitional injustice of erasing local stewardship is not merely an oversight but a pre-emptive disqualification that enables conservation without community consent—communities are rendered invisible before any formal decision about a privately-owned Eco-park is made. In the Portuguese lithium case, Savannah Resources’ acquisition of mining contracts has been marked by multiple violations of the Aarhus Convention (United Nations Economic Commission for Europe, Aarhus Convention Compliance Committee, 2025), including inadequate public consultation and restricted access to information, with decisions made through opaque top-down processes where public debates are perceived as formalities for external investors and policymakers (Piccardi et al., 2025). The Spanish coal phase-out case reveals how JTA implementation suffers from political cycles that disrupt revitalisation projects, while multiple administrative levels and frequent leadership changes undermine shared objectives (Zavala Pérez, 2025). When mining projects override community opposition, suspending democratic safeguards in the name of economic progress or national defence. The Serbian lithium case exemplifies how the promise of EU accession and good green citizenship serves to legitimise environmental sacrifice for cosmopolitan

justice ideals, positioning resistance as the parochial obstruction of a planetary necessity—a discourse that pre-emptively delegitimises opposition before any specific procedural failure occurs (Avramović et al., 2025).

5. Conclusions and Implications for Future Policy Directions

Overall, our case studies highlight a stark contradiction or paradox at the centre of the green (just) transition: policies designed to solve a global environmental crisis are, both in their planning and implementation, frequently generating green sacrifice zones, (re)vulnerabilising marginalised peoples, and reinforcing entrenched inequalities. The prevailing approach, characterised by top-down governance, a flawed system of impact measurement, and the erroneous assumption that “green” is inherently “just,” is disproportionately benefiting corporate actors and urban centres while marginalising and sacrificing already vulnerable subjects, including rural communities, Indigenous peoples, women, and low-income households. We emphasise how a systemic and intersectional approach to inclusive governance and stakeholder engagement is needed to bridge divides in the twin transition, whilst encouraging further research to understand and measure PEJ that would generate invaluable evidence on future vulnerability mapping in relation to the Warsaw International Mechanism on Loss and Damage.

In this article, we show that the prospective production of sacrificability operates through common patterns of structural injustice and pre-existing vulnerabilities that green transition policies encounter and amplify. In this sense, our analysis of our case studies through the five processes of PEJ indicates some persistent issues related to cross-sectoral and transnational coherence in the imagining, implementation, and governance of green/just/fair transition policy. Therefore, we consider PEJ as a lens of inquiry that can help shape and mitigate future policy impacts on vulnerable populations and future sacrifice zones. Our previous GreenPaths project deliverables provide a searchable database of indicators that assess the different social impacts of green transitions (Zavala-Pérez et al., 2024) and a sectoral mapping of approaches and methodologies currently used to identify, foresee, and assess green transition policy interventions in Europe (Chavez et al., 2024) that could be harnessed and built on.

For example, relating to critical mineral extraction and related green energy projects, the UN Economic Commission for Europe’s Aarhus Committee provides important oversight of the Aarhus Convention’s implementation. In a 2023 country report on Portugal, former UN Special Rapporteur for the environment David R. Boyd recommended the formation of specialised environmental courts that improve access to environmental information, strengthen public participation, and facilitate access to justice, including adherence to and penalties for breaching public consultation in environmental projects under the Aarhus Convention and complying with international law on environmental protection and restoration (e.g., European Parliament and Council of the European Union, 2024a, 2004b). Such courts can provide a forum for future consultation on and monitoring of socio-environmental impact assessments for potential critical mineral extraction, green infrastructure, or energy projects.

The Just Transition Mechanism and Fund’s aims to mobilise financial resources to cover the social costs of economic diversification of the territories most affected by the transition, including the reskilling of labour, and associated Territorial Just Transition Plans, as evident in coal phase-out case study, identifies some positive moves in the early implementation of two of Spain’s 15 JTAs and provides some suggestions on how future JTAs could be improved. As Zavala Pérez suggests: “policies must address socioeconomic patterns

rooted in decades or even centuries of history;” they should balance the needs and expectations of diverse socioeconomic groups, whilst embedding into policy design: “educational reform, local and regional diagnostics, transparent communication, ongoing monitoring, and fair responsibility sharing” (Zavala Pérez, 2025, p.25). These factors, coupled with the fact that fossil fuel phase-out has been anticipated for decades, point to the need for pre-emptive rather than reactive measures.

Our findings also indicate high socio-environmental costs that represent key future vulnerabilities in Southern and Eastern Europe’s just transition. Negative SEJ impacts reinforce pre-existing vulnerabilities based on gender, ethnicity, urban/rural location, and power imbalances between the EU’s core and its periphery. The different dimensions of SEJ are preceded by prospective environmental injustices that lay the groundwork for green-grabbing for mineral extraction, agricultural, or neo-conservation projects; tangible and intangible loss and damage to (supposedly protected) cultural heritage and ancestral practices; a lack of public inclusion and consultation in policy design, implementation, and effective policy monitoring mechanisms that ensure public concerns are addressed (restorative justice). The invisibilising of lower-income residents predicates a lack of public participation, due process, and transparency. Vulnerable groups are sidelined by influential geopolitical actors (i.e., large corporations, international investors, state elites, property, and landowners) with the capacity to access subsidies and finance that drive the transition.

The potential of PEJ mitigation and future vulnerability mapping is undermined by gaps in measurement that include a lack of intersectional and socio-geographic data about marginalised, vulnerable, and impacted populations (i.e., low-income households, rural communities, Indigenous peoples, precarious workers, and small-scale farmers), that could provide insights on, for example, economic (e)migration patterns, land use, subsidy beneficiaries, employment quality, environmental effects, and distributional outcomes. Furthermore, standard assessments often ignore non-material losses and psychosocial harms and fail to adequately evaluate SEJ: predominantly quantitative economic and CO₂-related metrics often sideline the social dimensions of the transition, leading to outcomes where environmental improvements coincide with societal deterioration.

Our analysis highlights cross-case instances of PEJ, which point to the complexity and contentious temporality of just transition initiatives that package policies in terms of before and after promises of bright green futures. The core “leave no one behind” principle of the European Green Deal faces the same challenge as its previous iteration under the sustainable development goals, in that there is no serious structural approach to protecting the most vulnerable to development. The anticipatory nature of many of the costs and benefits identified are, in some cases, predictive or promissory; they represent fears and aspirations of the green transition. The PEJ issues identified in our research are interconnected, intersectional, and interdisciplinary. To align the green transition with the principles of justice and social wellbeing, a fundamental shift is urgently needed from technical, top-down implementations to approaches that deliberately centre SEJ within legal frameworks, with policy tools that ensure robust democratic governance, genuine community engagement, and procedural justice, moving beyond tick-box consultation to empower local communities in decision-making about their environment’s protection, socio-economic futures, and resource use.

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Conflict of Interests

The authors declare no conflict of interests.

Data Availability

Data relating to GreenPaths research is accessible through the University of Cantabria's UCrea platform, which has a free and standardised access protocol. UCrea is an OpenAIRE and OAI-PMH compliant repository.

Supplementary Material

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

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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 & Akpinar, 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.

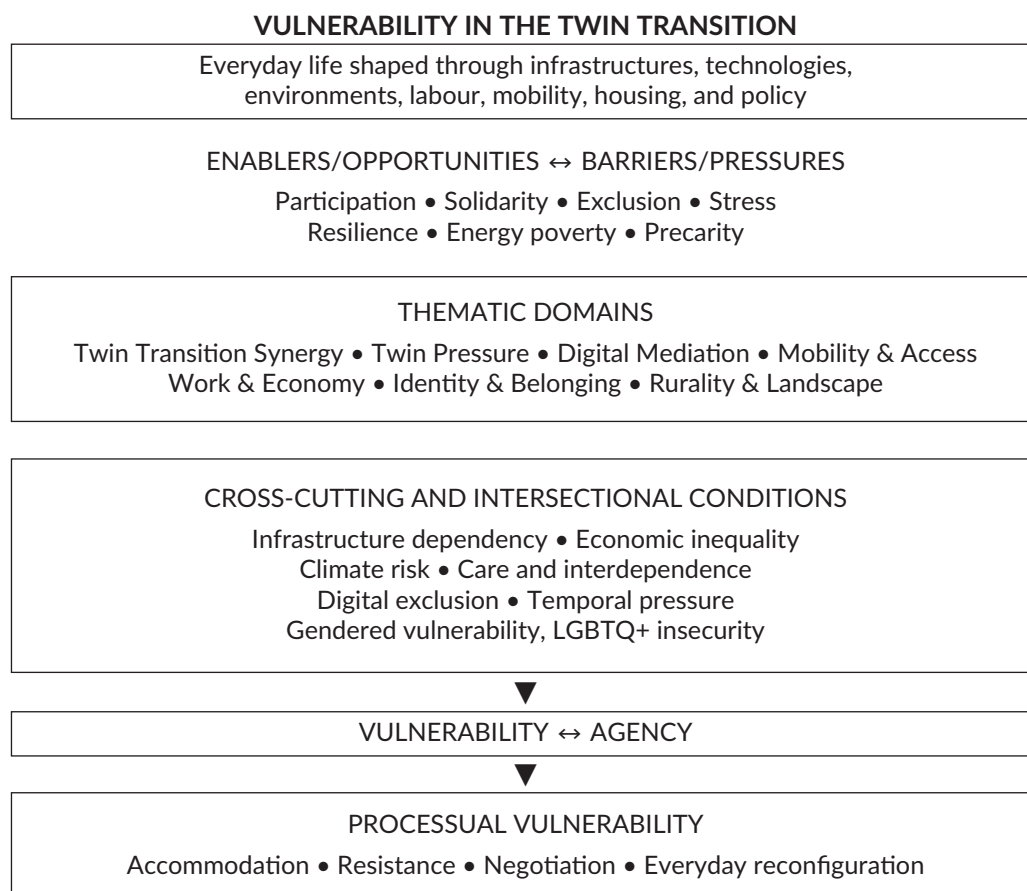


Figure 1. Processual vulnerability. Notes: The first box identifies how the twin transition intervenes through policy and socio-technical systems, placing everyday life under pressure and redistributing resources; the synchronic modification of green and digital aspects in this box is what makes production 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

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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).

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Profiles of Structural Exclusion in the Twin Transition: Ideal Types, Political Disaffection, and Participatory Governance

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Abstract

This article analyses how the simultaneous pursuit of green decarbonisation and digital transformation—the twin transition—generates disproportionate structural burdens on marginalised social groups. Drawing on Max Weber’s ideal-type methodology (*Idealtypus*) and Spanish statistical evidence, it develops six prototypical profiles of structural exclusion across key twin-transition sectors: urban mobility and transport, the platform and gig economy, rural energy and depopulation, digital public infrastructure and smart cities, digital agriculture, and urban renovation. Each profile identifies the mechanisms through which green and digital policies impose unequal costs on vulnerable groups, examining the resulting dynamics of institutional disaffection, potential political radicalisation, and common structural patterns. Comparative analysis identifies four recurring exclusion mechanisms—the upfront cost barrier, the digital literacy gateway, the geographic penalty, and knowledge disqualification—tracing a common pathway from structural exclusion to political disaffection. The article concludes by proposing five governance principles grounded in community work and participatory governance, offering a framework transferable to comparable EU contexts.

Keywords

community work; digital transition; energy poverty; green transition; mobility justice; participatory governance; precariate; radicalisation; social exclusion; twin transition

1. Introduction: The Twin Transition and the Risk of a Divided Society

The simultaneous pursuit of green decarbonisation and digital transformation, generally known as the twin transition, represents one of the most ambitious structural transformations of our era. Promoted by the EU through the European Green Deal and Digital Compass 2030, this dual transformation promises a cleaner and more prosperous future (European Commission, 2019, 2021a; Kovacic et al., 2024). However, the twin transition is not neutral: Its costs and benefits are distributed unevenly across social groups, geographic territories, and generational cohorts (Kovacic et al., 2024; Petmesidou & Guillén, 2022). While it opens opportunities for educated, digitally literate, and economically secure populations, it simultaneously imposes substantial burdens on low-income households, rural communities, precarious workers, older adults, and migrants (Rodríguez-Pose & Bartalucci, 2024). Without deliberate redistributive and participatory mechanisms, it may fuel social disaffection, institutional distrust, and, in the most acute cases, radicalisation and support for extremist movements (Bosetti et al., 2025; Rodríguez-Pose & Bartalucci, 2024; Yazar & Haarstad, 2023). We term this condition “transition precarity.”

These dynamics have been approached from multiple disciplinary angles. Energy poverty research has documented the regressive distributional effects of green policies on low-income households (Bouzarovski & Petrova, 2015). Mobility justice scholarship has examined how transport decarbonisation can harm peripheral workers (Kuttler & Moraglio, 2020). Digital inclusion research has mapped structural barriers for older adults, rural, and low-income populations (van Dijk, 2019). Labour studies have documented platform economy precarity (Fairwork España, 2025; Mandl, 2021). Urban political ecology has examined eco-gentrification and its displacement effects on working-class communities (Anguelovski et al., 2018; Checker, 2011). Three significant gaps remain: the absence of an integrated cross-sectoral analytical framework; the unsystematic link between material exclusion and political disaffection in transition governance analysis; and the understudied potential of community work as a structural governance response. This article addresses all three through Weberian ideal-type methodology applied to six key twin-transition sectors.

The twin transition is not self-executing but deliberately steered by a coalition of institutional actors: the European Commission through the European Green Deal and Digital Compass 2030; national governments through National Energy and Climate Plans and Recovery and Resilience Plans; and large platform corporations, energy utilities, and real estate investors whose market power shapes distributional consequences. The absence of community organisations from this governance architecture is structural: These actors are potential co-architects whose inclusion is a democratic requirement, as the five governance principles developed in Section 6 demonstrate.

To analyse these dynamics, Max Weber’s sociological tool of the “ideal type” (*Idealtypus*) is employed. Six ideal-type scenarios are developed across key sectors of the twin transition: urban mobility and transport, the platform and gig economy, rural energy and depopulation, digital public infrastructure and smart cities, digital agriculture, and urban renovation. Each scenario is structured around five analytical elements: (a) statistical vulnerabilities and structural profile; (b) mechanisms of exclusion; (c) disaffection and radicalisation dynamics; (d) the potential of community work and participatory governance to provide viable responses; and (e) specific policy recommendations.

2. Theoretical Framework: Ideal Types, Transition Justice, and Community Work

2.1. The Weberian Ideal Type as Analytical Tool

Max Weber's concept of the ideal type (*Idealtypus*) constructs an analytical model by accentuating the characteristic features of a social phenomenon. It is not a description of reality in its full complexity, but a conceptual tool enabling systematic comparison and explanation (Weber, 1949). In this article, ideal types construct prototypical profiles grounded in statistical evidence and analytically sharpened to reveal the essential mechanisms of exclusion. They also illuminate the “elective affinities” (*Wahlverwandtschaften*) between structural vulnerability and political disaffection: how precarity, exclusion, and perceived injustice create conditions of receptivity to populist and extremist narratives that instrumentalise grievances generated by the transition.

Ideal types are analytically constructed, not empirically observed, and their relationship to lived experience is necessarily partial. Real individuals frequently inhabit multiple scenarios simultaneously: A rural older adult woman may also be a gig-economy worker's dependent, and a peripheral urban worker may simultaneously face digital exclusion. The heuristic value of the method lies precisely in its deliberate analytical simplification, enabling systematic structural comparison that would be impossible through more holistic descriptive approaches (Weber, 1949). This epistemological self-awareness does not undermine the analysis but frames its proper scope.

The Weberian method has been applied productively in adjacent fields: Esping-Andersen's (1990) welfare state regime typology, Rubery's (1997) comparative employment models, and Wacquant's (2008) advanced marginality ideal type all deploy the same logic of constructing analytically sharpened models that reveal structural patterns not visible through purely empirical description. In transition governance research, this tradition offers an important advantage over vulnerability indices or capability approaches: It foregrounds the mechanisms through which exclusion is produced rather than merely its distributional outcomes, enabling identification of community-based interventions targeted at the process of exclusion rather than at its symptoms.

A central conceptual question is whether the “twin transition” constitutes a genuinely integrated structural transformation or two parallel processes that co-occur without necessary integration (Kovacic et al., 2024). We acknowledge this empirical debate: Available evidence suggests that, in most national contexts, green and digital transitions evolve under distinct institutional logics, driven by different policy communities and investment frameworks, and that their interactions are contingent rather than systemic (Gao, 2024; Kovacic et al., 2024). Our use of “twin” refers primarily to the EU policy framing (European Green Deal + Digital Compass 2030) that has structured the governance environment within which both transitions unfold simultaneously. The analytical contribution of this article is to examine how the compounded social costs of these two co-occurring structural transformations fall on the most vulnerable, regardless of whether their integration is ontological or merely political.

2.2. Transition Justice and the Distributive Dimension of Green and Digital Policy

The “just transition” framework has extended beyond coal communities facing deindustrialization (Morena et al., 2020; Snell, 2018) to encompass three justice dimensions: distributional justice (who bears costs and receives benefits), procedural justice (who participates in decision-making), and recognition justice (whose knowledge, values, and identities are acknowledged; McCauley & Heffron, 2018; Schlosberg, 2007).

Each of the six ideal-type scenarios can be mapped onto one or more of these justice dimensions, providing a theoretical thread that runs across the scenario analysis. Scenario 1 (Manuel) is primarily an instance of distributional injustice. Scenario 2 (Ana) combines distributional and procedural injustice. Scenario 3 (María) is primarily distributional and procedural, with a strong recognition dimension: Her knowledge, values, and rural identity are systematically disregarded by digitally mediated policy design. Scenario 4 (Pilar and Karim) is a case of procedural and distributional injustice: Algorithmic route optimisation produces distributional harm, and neither has any voice in the smart city governance that shapes their mobility. Scenario 5 (José and Lucía) is centrally a question of recognition justice: The twin transition implicitly delegitimises José’s accumulated traditional agricultural knowledge. Scenario 6 (Sofía) involves all three dimensions simultaneously: distributional dispossession through eco-gentrification, procedural exclusion from renovation governance, and the non-recognition of existing community identity and social fabric.

2.3. Community Work as Democratic Counter-Practice

The structural mechanisms of exclusion identified above call for governance responses capable of addressing both their material and democratic dimensions. Against the technocratic and market-oriented logics that dominate twin-transition governance, community work offers an alternative model grounded in participatory democracy, asset-based community development, and the co-production of public goods (Banks, 2020; Gilchrist, 2019). In the context of the twin transition, it plays three interconnected functions: mediating transition costs for vulnerable groups; creating participatory spaces for co-designing inclusive transition pathways; and countering disaffection and extremism by providing constructive channels for grievances and building solidarity.

For analytical clarity, four modalities of community work are deployed across the scenarios (Banks, 2020; Gilchrist, 2019): (a) professional community work, involving trained practitioners who facilitate participatory processes with marginalized communities (prominent in Scenarios 3 and 6); (b) community organizing, understood as the collective self-mobilization of affected communities (central to Scenario 6); (c) cooperative economic models, including platform cooperatives, energy cooperatives, and technology commons, through which communities collectively own and govern productive assets (central to Scenarios 2, 3, and 5); and (d) co-design and participatory planning processes, through which communities contribute to the design of public infrastructure and policy (prominent in Scenarios 1, 4, and 5).

It is equally important to acknowledge the structural limitations of participatory governance. The empirical literature identifies several recurring challenges (Arnstein, 1969; Fung, 2006): low and unequal uptake, with the most marginalised groups least likely to participate without active outreach; institutional capture by better-resourced actors; the risk of tokenism, in which communities are consulted rather than genuinely empowered; and the tension between participation as a resource-intensive slow process and the technical

speed of transition implementation. Genuine co-governance—as distinct from consultation—requires sustained institutional support, legal recognition, and adequate resourcing of community organisations as governance actors.

2.4. Transition Precarity as an Analytical Concept

“Transition precarity” denotes the structurally induced condition of heightened vulnerability specifically produced or exacerbated by green and digital policy transitions, as distinct from pre-existing forms of socioeconomic precarity. While Guy Standing’s “precariat” designates a class of workers characterised by insecure labour market position, absent occupational identity, and inadequate social protections (Standing, 2014), “transition precarity” refers to the additional layer of vulnerability imposed on already disadvantaged groups by the governance architecture of the twin transition itself: upfront capital requirements they cannot meet, digital literacy prerequisites they do not possess, administrative processes they cannot navigate, and territorial patterns of investment from which they are structurally excluded. Transition precarity may compound pre-existing precarity (as in Ana or María) or may affect groups not otherwise characterised by labour market precarity (as in José, whose agricultural knowledge is delegitimised by Common Agricultural Policy [CAP] digitalisation, or Sofía, whose community is displaced by green renovation).

3. Methodology

The six ideal-type scenarios were constructed through a secondary statistical analysis combined with a systematic literature review. Six sectors were selected to cover major EU twin-transition domains identified in EU policy frameworks: urban mobility and transport; the platform and gig economy; rural energy and depopulation; digital public infrastructure and smart cities; digital agriculture; and urban renovation. Statistical profiles were constructed from Eurostat, the Instituto Nacional de Estadística (INE), Eurobarometer surveys, and sector-specific administrative datasets (Dirección General de Tráfico; Ministerio de Agricultura, Pesca y Alimentación; Consorcio Regional de Transportes de Madrid). Exclusion mechanisms were identified inductively from the statistical and empirical literature on each sector, then organised deductively through the five-part Weberian analytical template.

The community-based responses included in each profile were identified through a systematic review of documented European practices in three areas: (a) community work and social intervention, drawing on the academic literature on participatory governance, asset-based community development, and co-production of public services (Arnstein, 1969; Banks, 2020; Fung, 2006; Gilchrist, 2019; OECD, 2023a, 2023b); (b) cooperative economic models, including platform cooperatives, energy cooperatives, and technology commons, drawing primarily on documented European cases and OECD comparative evidence (Coopcycle, 2026; OECD, 2023a, 2023b); and (c) participatory planning and co-design processes, drawing on documented EU urban mobility and renovation programmes (European Commission, 2021b; WeCount Consortium, 2022). The selection criterion for each response was demonstrable implementation in at least one European context, with preference given to cases documented in peer-reviewed literature or rigorous grey literature from reputable institutional sources.

The policy recommendations in each profile were derived directly from the exclusion mechanisms identified in the Weberian analytical template for that sector: each recommendation targets one or more of the

mechanisms listed in the corresponding table and is grounded in the same empirical and academic literature used to identify those mechanisms. They are therefore not prescriptive proposals external to the analysis, but operational implications of the structural diagnosis conducted within each ideal type. Their synthesis, into five higher-order governance principles, is developed in Section 5.

Community-based responses were identified from documented European practices in community work, cooperative economics, and participatory governance (Arnstein, 1969; Banks, 2020; Fung, 2006; Gilchrist, 2019; OECD, 2023a, 2023b). The limitations of this approach include: (a) the ideal types are Spanish-context constructions whose transferability to other EU contexts requires institutional adjustment; (b) reliance on secondary data means scenarios cannot capture subjective experience; and (c) analytically constructed types necessarily simplify the complexity of real social situations.

4. Six Ideal-Type Scenarios: Structural Exclusion and Community Responses

4.1. *Ideal Type 1: Manuel—Metropolitan Periphery & Mobility Exclusion*

Low-income peripheral worker, male, mid-career, adversely affected by Low-Emission Zone (LEZ) restrictions in a major urban area.

Manuel is a 52-year-old maintenance worker in Madrid's outer belt whose diesel vehicle, over 15 years old, has been restricted from the city-centre LEZ since 2023. Approximately 70% of vehicles over 15 years old in Spain are diesel, concentrated in lower-income households (Dirección General de Tráfico, 2023, 2024). The average new electric vehicle (EV) costs €37,000 versus €18,000 for a comparable second-hand petrol car (Asociación Española de Fabricantes de Automóviles y Camiones, 2025), and one-third of households below €18,000/year cannot afford replacement even with subsidies (Comisión Nacional de los Mercados y la Competencia, 2023). The Auto+ programme (formerly Plan MOVES III, Movilidad con Vehículos de Emisiones reducidas), in force since January 2026 as part of the Plan España Auto 2030, applies subsidies of up to €4,500 directly at the point of sale, removing the upfront payment barrier of its predecessor. However, with eligible vehicles capped at approximately €45,000, the programme remains structurally inaccessible for households with monthly incomes below €1,200, for whom even the post-subsidy price of a new EV exceeds several years of disposable income (Ministerio de Industria y Turismo, 2026). Public transport alternatives are inadequate: Outer Madrid average commutes exceed 90 minutes per trip (Consortio Regional de Transportes de Madrid, 2018), producing "mobility poverty" (Kuttler & Moraglio, 2020) as a direct outcome of the green transition. Table 1 maps the five exclusion mechanisms identified in this scenario against the corresponding community-based responses.

Manuel's disaffection is structural, not ideological: He does not object to clean air in principle, but to a policy that imposes costs he cannot bear while offering benefits he cannot access. Climate scepticism is more prevalent among older, lower-income, and right-leaning populations (Fundación BBVA, 2026), and digital platforms systematically amplify conspiratorial content for users like Manuel (EU DisinfoLab, 2025), creating fertile ground for far-right movements that reframe these grievances as elite contempt for working-class mobility. Community-anchored mobility cooperatives and participatory LEZ governance can simultaneously address material harm and restore democratic inclusion (European Commission, 2021b; WeCount Consortium, 2022).

Table 1. Exclusion mechanisms and community entry points in the ideal type of metropolitan periphery and mobility exclusion.

Exclusion Mechanisms	Community-Based Responses
Old diesel car restricted from the city centre since 2023	Targeted income-conditioned mobility subsidies (no upfront)
Cannot afford EV replacement (€37,000 average)	Affordable green micro-mobility cooperatives (e-bikes)
Auto+ subsidies (up to €4,500) remain inaccessible: Vehicle price cap (~€45,000) far exceeds purchasing capacity	Participatory LEZ design with periphery residents
No viable public transport alternative (90+ min commute)	Expanded and subsidised electric bus network to the periphery
Inability to access transition support due to time poverty and administrative complexity	Community digital literacy to navigate institutional tools

The following measures are recommended:

1. Progressive reform of the Auto+ programme to introduce income-conditioned subsidy tiers for households below €18,000/year, including a dedicated low-income track with enhanced subsidy amounts and eligibility for affordable second-hand EVs;
2. Periphery transport investment mandate requiring metropolitan authorities to publish and remedy connectivity gaps;
3. Participatory LEZ design making resident consultation a legal prerequisite before expansion;
4. Green micro-mobility cooperatives providing shared e-bike access in underserved neighbourhoods;
5. Community digital literacy programmes funding critical media workshops in peripheral community centres.

4.2. Ideal Type 2: Ana—Precarious Gig Worker in the Digital Economy

Young precarious platform worker, female, urban, doubly excluded by digital algorithmic control and green mobility restrictions.

Ana is a 28-year-old food delivery rider in Barcelona with income fluctuating between €900–1,100/month (Hidalgo et al., 2024). Despite working 45–50 hours weekly for a single platform, she lacks sick leave, unemployment insurance, or maternity protection due to misclassification as self-employed (Mandl, 2021). Her entire employment relationship is mediated by algorithmic management with no transparency or negotiation (Agosti et al., 2024; Fairwork España, 2025). The green transition further compounds her vulnerability: Replacing an ageing combustion vehicle with an electric alternative requires €3,000–5,000, prohibitive given her income. Her situation is compounded by intersecting gender vulnerabilities: Women in the gig economy face income gaps relative to male peers, greater exposure to harassment in public spaces, and lower access to digital upskilling programmes (European Institute for Gender Equality, 2021). When the green transition additionally threatens her only productive asset through LEZ restrictions, the perception that the transition is designed against her becomes difficult to counter through purely discursive means.

Table 2 maps the five exclusion mechanisms identified in this scenario against the corresponding community-based responses.

Table 2. Exclusion mechanisms and community entry points in the ideal type of a young female precarious platform worker.

Exclusion Mechanisms	Community-Based Responses
Algorithmic management with no transparency or negotiation	Platform worker cooperatives with democratic governance
No labour rights: sick pay, maternity leave, pension	Platform cooperative development funds providing full employment contracts and social protection
Old motorcycle restricted by LEZ emission policies	Algorithmic transparency regulation and worker education
Income too low to replace vehicle with electric alternative	Collective bargaining support under the Riders' Law framework
Intersecting gender vulnerabilities in the gig economy	Gender-sensitive audits of gig economy regulation

Ana's disaffection manifests as political abstention, anomic cynicism, and horizontalist protest rather than far-right sympathies, but represents a significant legitimacy deficit for the twin transition. Only 46% of Europeans are confident sustainable goods will be affordable for all, and perceptions of fairness have declined sharply among young people (Eurobarometer, 2022a, 2022b). The platform cooperative model—worker-owned, democratically governed cooperatives replacing algorithmic control with collective governance and full employment contracts—has proven viable where municipal support addresses the structural obstacle of start-up capital (Christiaens, 2025; OECD, 2023a, 2023b).

The following measures are recommended:

1. Platform cooperative development funds providing municipal co-investment for worker-owned delivery cooperatives;
2. Fair mobility schemes designing specific EV subsidies for platform workers with deferred payment;
3. Algorithmic transparency obligations mandating intelligible explanations of pay and scheduling algorithms;
4. Funding community-based workshops on digital rights education, algorithmic governance and platform worker organising;
5. Intersectional policy audits requiring gender-sensitive impact assessments for all green mobility regulations affecting the gig economy.

4.3. Ideal Type 3: María—The Invisible Rural Pensioner

Older adult rural woman, low pension, energy-poor, digitally excluded, perceiving the urban ecological agenda as alien and hostile to her daily reality.

María is a 67-year-old widow in a village of fewer than 500 inhabitants in Castilla-La Mancha with a pension of €810/month, well below the national average ("La pensión media," 2024). She spends over 10% of her income on energy, exceeding the EU energy vulnerability threshold. In Spain, 20.8% of households could

not adequately heat their homes in 2023, with severe energy poverty hotspots concentrated in Castilla-La Mancha and Extremadura (Eurostat, 2024; Santos, 2025). Installing solar or heat pump systems requires €8,000–15,000 upfront investment (Instituto para la Diversificación y Ahorro de la Energía, 2026). Online-only subsidy applications exclude her by design: Around 20% of those aged 65–74 lack the digital skills to navigate such applications effectively (INE, 2024). Women over 65 are more likely to live alone, have lower pensions reflecting historical labour market exclusion, and face higher poverty risk—a compounded vulnerability mainstream transition policy has failed to address (EgaleCo Lab, 2025).

Table 3 maps the five exclusion mechanisms identified in this scenario against the corresponding community-based responses.

Table 3. Exclusion mechanisms generated by the twin transition and community entry points in the ideal type of an older adult rural pensioner.

Exclusion Mechanisms	Community-Based Responses
Energy expenditure exceeds 15% of pension income	Rural community energy cooperatives (collective solar)
Cannot afford solar or heat pump installation	Digital intermediaries (“digital warm experts”) for elderly residents
Online-only subsidy applications exclude her by design	Mandatory offline application channels for all subsidies
Rural connectivity gap (83% vs 95% urban internet access)	Multi-service rural community hubs
Gendered pension gap: income below the national average	Rural representation quotas in green policy advisory bodies

Voting behaviour research shows that depopulating Spanish municipalities have recorded growing electoral support for radical right and rural-populist parties as a function of structural abandonment rather than ideology (Sánchez-García et al., 2025), a pattern Rodríguez-Pose and Bartalucci (2024) identify as a likely driver of “green discontent” in left-behind regions. The “España Vacía” (Emptied Spain) narrative—representing depopulating rural and inland territories that feel systematically abandoned by the state—reflects genuine structural marginalisation that makes green transition promises seem hostile rather than supportive. Rural community energy cooperatives—piloted in Castilian municipalities with Liaison Entre Actions Développement de l’Économie Rurale programme support (EU CAP Network, 2026)—collectively eliminate individual capital barriers while distributing benefits equitably. The “digital warm expert” model (trained local intermediaries accompanying residents through applications) builds sustainable local capacity while respecting dignity (Alonso González et al., 2026; Bakardjieva, 2005; Hänninen & Taipale, 2025).

The following measures are recommended:

1. Rural community energy cooperatives with dedicated EU LEADER and PERTE (Proyecto Estratégico para la Recuperación y Transformación Económica; Ministerio de Industria y Turismo, 2021) funding;
2. Funding a digital warm expert programme to train and deploy community intermediaries in municipalities with above-average over-65 populations;
3. Universal offline access mandating paper/in-person applications for all public support programmes;

4. Multi-service rural hubs offering integrated energy, digital, health, and social services in municipalities under 1,000 inhabitants;
5. Rural representation in green governance through mandatory rural quotas in advisory bodies.

4.4. Ideal Type 4: Pilar and Karim—The Invisible Citizens of the Smart City in a City Without Tickets

Older adult woman without smartphone and precarious migrant worker, both structurally excluded by algorithmic public transport optimisation in a fully digitalised urban mobility system.

Pilar is a 78-year-old retired seamstress without a smartphone. Karim is a 34-year-old Moroccan–Spanish logistics worker dependent on peripheral bus lines for his multi-job commute. Both are adversely affected by Madrid’s transition to digitalised public transport, including virtual ticketing via smartphone and planned account-based ticketing by 2027. Around 20% of those aged 65–74 lack digital skills to navigate transport applications effectively (INE, 2024). Demand-optimised transit planning deprioritises low-frequency peripheral routes serving working-class neighbourhoods, a form of algorithmic retrenchment flagged by the European Parliament as a driver of transport poverty (Berthereau, 2023; European Parliament, 2022). Karim’s split-shift mobility needs do not conform to peak-demand patterns that algorithms optimise for, making the smart city’s “efficiency” a de facto class logic. Algorithmic route optimisation systems, trained primarily on mobility data from higher-income and majority-population users, risk systematically undercounting the mobility needs of workers in peripheral employment (Benjamin, 2019; Eubanks, 2018).

Table 4 maps the five exclusion mechanisms identified in this scenario against the corresponding community-based responses.

Table 4. Exclusion mechanisms and community entry points in the ideal type of those affected by a ticketless urban transit system.

Exclusion Mechanisms	Community-Based Responses
No smartphone: excluded from digital-only payment systems	Hybrid payment systems (reloadable cards at local shops)
Peripheral bus lines cut by demand-optimisation algorithm	Community transport mapping of mobility dead zones
No voice in smart city design or route decision processes	Participatory neighbourhood transport planning
Migrant worker: additional language and documentation barriers	Multilingual community outreach and documentation support for migrant transport users
Multi-job split shifts invisible to algorithmic route planning	Community-led shift-pattern mapping to make split-shift mobility needs visible to transit planners

For Pilar, the elimination of physical tickets represents institutional contempt. For Karim, the algorithmic dismantling of peripheral bus lines confirms his structural invisibility to urban planners. Urban exclusion and infrastructural abandonment are among the strongest structural drivers of institutional distrust, particularly combined with ethnic minority status and precarious employment (Rodríguez-Pose, 2018; Wacquant, 2008). Community participatory transport mapping demonstrates that “efficiency” must be measured in social terms, not merely algorithmic optimisation of aggregate demand (Lucas et al., 2016; WeCount Consortium, 2022).

The following measures are recommended:

1. Hybrid digital-physical payment infrastructure mandating non-smartphone payment options as a legal accessibility requirement;
2. Participatory route impact assessments requiring community consultation before algorithmic route modifications;
3. Community UX co-design involving elderly, migrant, and low-income users in the design of all digital public interfaces;
4. Community-managed transport services piloting resident-governed minibuses for underserved peripheral routes;
5. Digital rights in urban planning law establishing statutory rights to non-digital access to all essential public services.

4.5. Ideal Type 5: José and Lucía—Generational Fracture in the Smart Farm

Traditional smallholder farmer versus young agro-tech cooperative manager, intergenerational knowledge conflict at the intersection of precision agriculture, EU environmental regulation, and rural social cohesion.

José is a 70-year-old Galician smallholder with 30 hectares, managing his land with inherited ecological knowledge. Lucía, 31, manages the local cooperative and is the primary interlocutor with EU funding institutions. The average age of Spanish farm operators is 61.4 years, with only 7.7% under 40—the lowest EU share among major agricultural countries (Eurostat, 2022; INE, 2022). Digital agriculture tools require capital investment prohibitive for small holdings: 63% of Spanish farms have an annual output below €15,000 (INE, 2022), making such investment structurally inaccessible. Three-quarters of farm operators have no formal agricultural training beyond practical experience (Ministerio de Agricultura, Pesca y Alimentación, 2022). The EU Farm to Fork Strategy and its implementation through the CAP 2023–2027 framework require digital record-keeping that, for José, represents not merely a technical burden but a delegitimisation of 50 years of accumulated expertise (European Commission, 2020, 2021a).

Table 5 maps the five exclusion mechanisms identified in this scenario against the corresponding community-based responses.

This scenario produces disaffection at the level of identity and dignity: The twin transition communicates to José that 50 years of accumulated knowledge are obsolete. Centro de Investigaciones Sociológicas (2024) data show farmers are the most right-leaning occupational group in Spain (mean ideological self-placement 6.2/10 vs. 4.9 general electorate), with Vox leading their voting intention at 29.8%—a pattern coinciding with far-right mobilisation of agrarian resentment against ecological policy (Romero, 2024; Ungureanu & Popartan, 2024). As a community-based response within this ideal type, Lucía's "just transition in the field" programme addresses this through reciprocal knowledge exchange: Elder farmers teach traditional ecological knowledge while younger members provide digital training and shared tool management, repositioning José's expertise as an asset to be actively sought and formally documented.

Table 5. Exclusion mechanisms and community entry points in the ideal type of generational fracture in the smart farm.

Exclusion Mechanisms	Community-Based Responses
Digital precision tools: capital cost €15,000–50,000 per holding	Technology commons cooperatives (shared precision tools)
CAP compliance requires digital record-keeping skills	Simplified and offline CAP compliance pathways for smallholders
EU regulations implicitly delegitimise traditional knowledge	Intergenerational knowledge exchange programmes and traditional knowledge documentation
Debt pressure on younger generation for equipment purchase	Cooperative credit schemes and collective equipment financing for smallholders
Generational conflict threatens family and community cohesion	Rural agroecology innovation hubs (multi-generational)

The following measures are recommended:

1. Technology commons cooperatives with dedicated EU and national funding for shared precision agriculture tools;
2. Intergenerational knowledge exchange programmes with formal recognition of traditional ecological knowledge;
3. Traditional knowledge documentation supporting community-based validation projects;
4. Simplified CAP compliance pathways developing offline routes for smallholders over 60;
5. Rural agroecology innovation hubs establishing multi-generational knowledge centres combining agroecological research with community education and cooperative business support.

4.6. Ideal Type 6: Sofia—Eco-Gentrification and the Dispossessed Community. The Green Eviction

Working-class woman, community organiser, single mother, facing displacement and loss of social fabric through eco-gentrification in a publicly funded zero-emission urban renewal zone.

Sofía is a 38-year-old single mother and neighbourhood association leader in an inner-city district declared a Zero-Emission Renovation Zone under an EU-backed programme funded through the Recovery and Resilience Facility. The programme includes mandatory energy retrofitting, pedestrianisation, creation of green spaces, and installation of community solar panels. On paper, a model of sustainable urban development. In practice, it has triggered acute eco-gentrification: Rental prices have risen substantially (Ministerio de la Vivienda y Agenda Urbana, 2026), consistent with the eco-gentrification dynamic whereby urban green investment drives displacement pressures on lower-income residents (Anguelovski et al., 2018; Gould & Lewis, 2017). Working-class businesses are displaced by organic food stores and co-working spaces, while lower-income long-term residents face systematic displacement as urban investment increases area desirability (López-Gay et al., 2021). Community land trust models have been identified as effective anti-displacement mechanisms in comparable contexts (Gould & Lewis, 2017).

Table 6 maps the five exclusion mechanisms identified in this scenario against the corresponding community-based responses.

Table 6. Exclusion mechanisms generated by the twin transition and community entry points in the ideal type of eco-gentrification and the dispossessed community.

Exclusion Mechanisms	Community-Based Responses
Green renovation triggers substantial rent increases	Community land trusts: non-profit perpetual affordable housing
Working-class businesses displaced by upmarket shops	Community-owned commercial spaces and local business protection agreements
Existing community not consulted on renovation design	Participatory co-design of renovation plans with existing residents as mandatory governance requirement
Energy retrofit investment benefits accrue to new owners	Participatory budgeting for green renovation funds
Resentment crystallises: “Your ecology is our eviction”	Right-to-return guarantees for displaced residents

Sofia’s case illustrates a distinctive form of political mobilisation: not toward passivity or far-right radicalisation, but toward active resistance and counter-hegemonic community organising. The slogan “Your ecology is our eviction”—coined here to encapsulate the core grievance of communities experiencing eco-gentrification—captures the insight that green urban policies designed without community participation can become instruments of class dispossession, regardless of their environmental merits, creating a perverse feedback loop where just transition failures produce anti-ecological attitudes (Anguelovski et al., 2018; Checker, 2011; Gould & Lewis, 2017). Sofia’s coalition of architects and housing rights lawyers develops a counterproposal on three pillars: a community land trust guaranteeing affordable rents in perpetuity; a community energy cooperative governing rooftop solar so benefits flow to existing residents; and co-designed public green spaces as urban allotments serving existing community needs.

The following measures are recommended:

1. Community land trust provisions mandated in all EU-funded urban renovation programmes;
2. Community energy governance requiring collective ownership of solar panels installed through public renovation programmes;
3. Urban allotments co-designed with existing communities;
4. Anti-displacement legal clinics providing free housing rights advice;
5. Participatory budgeting allocating a mandatory minimum of 20% of EU renovation funds to current residents;
6. Right-to-return guarantees for displaced residents at pre-renovation rental prices.

Table 7 synthesises the radicalisation pathways and community interruption points across all six scenarios.

Table 7. Radicalisation pathways and community interruption points across the six ideal-type scenarios.

Scenario	Structural Trigger	Disaffection Form	Radicalisation Risk	Community Interruption Point
1. Manuel Metropolitan periphery worker	LEZ restriction imposes direct cost on a marginal livelihood	Climate scepticism; green policy as class contempt	Far-right capture: green transition as elite aggression against working-class mobility	Mobility cooperatives restore material agency; participatory LEZ governance restores democratic inclusion
2. Ana Precarious platform worker	Algorithmic opacity denies voice and rights in the only employment available	Political abstention; anomic cynicism; horizontalist protest	Withdrawal from institutional politics; anti-platform and anti-green populism	Platform cooperatives replace algorithmic control with democratic governance; collective action rebuilds political efficacy
3. María Older adult rural pensioner	Cumulative exclusion: energy poverty, digital illiteracy, and geographic isolation	Green agenda perceived as urban imposition alien to rural life	Rural-populist mobilisation framing green transition as demographic contempt	Energy cooperatives provide material stake in transition; “digital warm expert” model restores dignified institutional access
4. Pilar & Karim Invisible citizens of the smart city	Algorithmic route optimisation and digital-only infrastructure produce invisibility	Institutional contempt confirming civic non-existence	Alienation from mainstream politics; susceptibility to anti-system narratives	Transport mapping makes invisible communities legible; hybrid payment systems restore material access
5. José & Lucía Generational fracture in the smart farm	Twin transition delegitimises traditional knowledge; EU compliance frames experience as obstacle	Identity wound: resentment at the perceived erasure of a lifetime of expertise	Agrarian far-right populism: EU technocracy framed as cultural war on rural livelihoods	Knowledge exchange repositions traditional expertise as asset; technology commons eliminates investment barrier
6. Sofía Eco-gentrification and the dispossessed community	Green renovation transfers value from existing residents to incoming capital	Counter-hegemonic resistance: active organising against displacement	Anti-green sentiment among natural transition allies; legitimacy crisis for environmental policy	Land trust and energy cooperative ensure benefits flow to existing residents; participatory governance converts residents into co-authors of renovation

5. Cross-Cutting Analysis: Structural Patterns Across the Six Scenarios

5.1. Common Mechanisms of Exclusion

Across the six scenarios, four common structural mechanisms of exclusion emerge consistently, regardless of sector or social profile:

1. The upfront cost barrier: All transitions require initial capital investment structurally inaccessible to low-income households. Subsidy programmes requiring upfront payment reproduce this barrier.
2. The digital literacy gateway: Public support programmes increasingly require digital access and literacy as a prerequisite for participation, systematically disadvantaging the elderly, rural populations, and recent migrants.
3. The geographic penalty: Green and digital transitions consistently generate better outcomes in dense urban centres than in peripheral or rural communities, amplifying existing territorial inequalities.
4. The knowledge disqualification: Transition policies implicitly delegitimise non-technological knowledge—traditional agricultural practices, collective urban memory, community governance experience—in favour of expert-driven and algorithm-mediated decision-making.

These four mechanisms map onto the three justice dimensions introduced in Section 2.2: The upfront cost barrier and geographic penalty are distributional failures; the digital literacy gateway combines distributional and procedural injustice; and the knowledge disqualification is centrally a recognition justice failure. Across all six scenarios, women in structurally equivalent positions face additional vulnerabilities through intersecting income gaps, care responsibilities, historical pension deficits, and greater exposure to displacement through eco-gentrification

5.2. The Radicalisation Pathway and Its Interruption

The six scenarios suggest a common pathway from structural exclusion to political disaffection that can, under certain conditions, culminate in radicalisation. The pathway moves through five stages: (a) material harm or perceived threat to livelihood; (b) institutional abandonment or perceived indifference; (c) narrative capture by far-right or populist movements that frame the transition as cultural contempt; (d) retreat into homogeneous digital information ecosystems that reinforce grievance; and (e) political radicalisation or withdrawal from democratic participation. Community work can interrupt this pathway at every stage: through material support, participatory governance, alternative narratives, and digital literacy.

It is essential to clarify that this pathway describes conditions of structural risk rather than causal necessity. Political radicalisation is a probabilistic outcome: The same material conditions can produce very different political responses depending on the availability of mediating institutions, local political cultures, and individual trajectories (della Porta, 2018; Norris & Inglehart, 2019). Community work functions precisely as such a mediating institution, redirecting structurally produced grievances toward constructive democratic channels, since the most effective radicalisation prevention addresses structural grievances directly rather than merely contesting extremist narratives (della Porta, 2018).

5.3. The Reactionary Instrumentalisation of Green Transition Grievances

A recurring dynamic across the scenarios is the instrumentalisation of green and digital transition policies by reactionary actors who reframe them as cultural aggression against working-class, rural, or older adults' populations. This reactionary narrative retains its purchase as long as the transition generates genuine uncompensated costs for the most vulnerable. Community work and participatory governance can delegitimise this framing by changing the material and institutional conditions that give it resonance.

The label “woke ecology,” deployed by far-right and rural-populist actors in Spain and across Europe (Ungureanu & Popartan, 2024), is an emic construct belonging to the vocabulary of the actors being analysed, not to the analytical framework of this article. The argument advanced here is not that ecological transition policy is culturally imperialist, but that when it generates genuine and uncompensated costs for the most vulnerable, this reactionary label acquires political traction that community work and democratic governance must actively work to displace.

6. Recommendations: Toward Just and Inclusive Twin-Transition Governance

The six scenarios converge on a common diagnosis: The twin transition, as currently governed, was not designed with justice as a constitutive requirement. The scenario-level policy recommendations are operational responses to specific exclusion mechanisms; what follows synthesises them into five higher-order governance principles—architectural requirements without which no combination of sectoral measures will be sufficient.

6.1. The Precondition Principle: Distributional Justice Before Implementation

Across all six scenarios, transition costs fall on those least able to bear them before any compensatory mechanisms become available. The precondition principle requires that no major green or digital policy instrument enters into force without a prior mandatory distributional impact assessment. Where significant regressive effects are identified, income-conditioned and payment-deferred access mechanisms must be embedded in the instrument's design from the outset, not added retrospectively.

6.2. The Universality Principle: Non-Digital Access as a Fundamental Right

Every scenario involves some dimension of digital exclusion, yet public support programmes and compliance frameworks are being redesigned around digital access as if it were universal. The universality principle requires that the right to non-digital access to all essential public services and support programmes be legally established at EU and national levels, with hybrid online-offline pathways mandated for all instruments funded through Just Transition or Recovery and Resilience mechanisms. Community digital intermediaries (the “digital warm expert” model) represent the human infrastructure for operationalising this principle in the most excluded communities.

6.3. The Co-Governance Principle: Participation as Structural Requirement, Not Procedural Gesture

The communities most adversely affected by the twin transition are consistently those with the least voice in its design—the predictable outcome of a governance architecture in which participation means consultation rather than co-governance. The co-governance principle requires that genuine community participation, defined as meaningful influence over outcomes, be a legally enforceable prerequisite for EU co-funded transition projects: mandatory community representation in governance bodies, participatory budgeting for a minimum share of transition funds, and, where anti-displacement or anti-exclusion safeguards are absent.

6.4. The Anti-Dispossession Principle: Transition Benefits Must Flow to Existing Communities

Three scenarios reveal a mechanism of injustice beyond unequal cost distribution: The green transition actively dispossesses existing communities by transferring the value of their spaces to incoming capital—most clearly through eco-gentrification (Scenario 6), but also when energy renovation increases property values for landlords while tenants are displaced. The anti-dispossession principle requires that all EU-funded transition programmes include enforceable mechanisms ensuring benefits flow to the communities that host them: community land trust provisions, collective ownership requirements for publicly funded energy infrastructure, right-to-return guarantees, and community benefit agreements as conditions of public co-investment.

6.5. The Legitimacy Principle: Counter-Radicalisation Through Democratic Inclusion

The radicalisation pathway identified across the scenarios does not originate in ideology but in structural experience. The communities most vulnerable to far-right mobilisation are not those with pre-formed anti-ecological values but those whose legitimate grievances have not been addressed by democratic institutions. Tactical interventions (media literacy, counter-narrative campaigns, algorithmic audits) address symptoms without touching causes. The legitimacy principle holds that the most effective counter-radicalisation strategy is a transition that is materially just, procedurally inclusive, and culturally respectful. When transition governance meets these conditions, the narrative that the transition is an urban elite project imposed on the excluded loses its purchase. Community work and participatory governance are not soft complements to transition policy; they are the democratic foundation on which its political sustainability depends.

7. Conclusion: The Twin Transition We Need

The twin transition is not a natural process but a political one. Its outcomes—who benefits, who bears costs, and who is left behind—are not predetermined by technological necessity but shaped by governance choices. The six ideal-type scenarios developed in this article, grounded in Weberian methodology and Spanish statistical evidence, demonstrate that the current trajectory of green and digital transformation risks reproducing and deepening structural inequalities while generating new forms of exclusion that fuel political disaffection and, in the most acute cases, radicalisation. The four mechanisms of exclusion identified (the upfront cost barrier, the digital literacy gateway, the geographic penalty, and the knowledge disqualification) constitute a diagnostic framework applicable to any sector or social group affected by the twin transition.

Community work and participatory governance are not soft complements to the “hard” work of technical transition. They are its democratic foundation.

Technical transition governance produces outcomes—lower emissions, higher connectivity, more efficient energy systems—but cannot, by itself, produce legitimacy: the consent and active participation of communities whose lives are being restructured. Legitimacy derives not from the quality of outcomes alone but also from the procedural conditions under which decisions are made. When communities co-govern the transitions affecting them, they become authors rather than objects of the transition. Community work organisations are the institutional carriers of this democratic capacity: Recognising them as governance infrastructure—with stable funding, legal status, and formal roles in transition decision-making—is not a social policy desideratum but a structural requirement of just transition governance.

The scenarios draw primarily on Spanish statistical evidence and institutional context. Their transferability requires attention to conditioning factors. The four structural mechanisms are empirically documented across multiple EU member states and are therefore structurally general. However, the severity with which they manifest varies significantly across welfare state architectures. Southern and Eastern European member states—characterised by lower welfare state generosity, higher rates of informal employment, greater rural-urban inequality, and weaker traditions of participatory governance—represent the most directly comparable contexts. Nordic and Western European welfare states may already have institutional resources that partially mitigate some of the mechanisms described.

The heuristic value of the Weberian ideal-type framework can be precisely stated. First, it enables cross-sectoral comparison, making visible common exclusion mechanisms invisible within single-sector analyses. Second, it connects individual vulnerability to structural process: Ideal types reveal the mechanisms through which transition governance itself produces exclusionary outcomes, independently of individual characteristics. Third, it bridges analysis and prescription, making the framework directly actionable for policy and practice while connecting material conditions to political dynamics in a way that neither social policy analysis nor democratic theory typically achieves alone. These three analytical affordances distinguish the framework from existing approaches in the transition justice literature.

The path toward a just and inclusive twin transition requires a fundamental reorientation of governance: from technocratic efficiency toward democratic legitimacy, from market-led distribution toward redistributive justice, and from top-down implementation toward genuine co-production with the communities most affected. The transition will be just, or it will not be stable. The choice is ours to make, and urgently so.

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Conflict of Interests

The authors declare no conflict of interests.

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ARTICLE

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Bridging or Deepening the Gap? Interaction Effects of Education and Disability on Digital Inclusion

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Abstract

The digital divide remains a critical challenge, as unequal access to technology reinforces existing social inequalities. Although education is a well-established factor in promoting digital inclusion, closing the gap requires a comprehensive examination of the interplay between education and other factors. Drawing on the social model of disability, this study examines whether the digital access gap between persons with and without disabilities widens at higher educational levels. This study evaluates digital disparities across four stages of digital access (mental, material, skills, and usage access) using Taiwan’s Digital Access Survey from 2020, 2022, 2023, and 2024. Multiple logistic regression models are employed to examine the interaction between education and disability status. The findings show that higher education is associated with more positive attitudes toward technology, greater internet adoption, stronger digital skills, and higher engagement in online activities such as financial and government services. However, these benefits are generally less pronounced for persons with disabilities. In contrast, more fundamental domains, such as social and healthcare usage, show more comparable patterns across people with and without disabilities. These results suggest that digital inequality is not uniform across different dimensions of digital access and may be shaped by inaccessible environments and structural inequalities embedded within digital and social systems. As such, merely raising overall educational levels may be insufficient to bridge the digital divide and may even allow inequalities to persist beneath the appearance of educational equality. Digital inclusion policies should therefore pay greater attention to the structural conditions that continue to marginalize persons with disabilities.

Keywords

digital inclusion; disability; education; social model of disability; structural barriers

1. Introduction

Digital development is often associated with greater opportunities and social advantages; consequently, ensuring inclusive participation in digital transformation has become a critical issue (Reisdorf & Rhinesmith, 2020). For persons with disabilities, however, digital technologies represent both opportunities and risks. Although digital development may bridge inequalities by reducing stigma and promoting social participation (Raja, 2016; Scanlan, 2022), it may also widen disparities when accessibility barriers and ableist norms persist (Cocq & Ljuslinder, 2020; Ellis & Goggin, 2015).

A growing body of research has examined the relationship between disability and the digital divide. Studies suggest that persons with disabilities experience disadvantages in certain forms of digital access, while variation also exists across socioeconomic backgrounds (Duplaga, 2017; Pettersson et al., 2023). Research has also shown that different impairment groups may encounter distinct forms of digital barriers (Tsatsou, 2020). In response, prior studies have explored various approaches to improving digital inclusion, including inclusive educational design, assistive tools, and accessibility-oriented technologies (Putri et al., 2025; Samaniego López et al., 2025; Zorec et al., 2025). These efforts substantially advance understanding of the digital disability divide.

Nevertheless, although education is widely recognized as a key driver of digital inclusion (Lythreatis et al., 2022; van Deursen & van Dijk, 2014), less is known about whether educational advantages are equally shared between persons with and without disabilities. This concern resonates with the perspective of intersectionality, which emphasizes that inequalities emerge through overlapping social positions (Atewologun, 2018). For example, Crenshaw (2015) argued that Black women remain disadvantaged because their experiences cannot be explained by race or gender alone. Likewise, while education is expected to shape individuals' motivation, digital literacy, and ability to perform complex online tasks (van Dijk, 2017), disability status may reflect structural and contextual barriers that constrain the returns to educational capital (Vicente & López, 2010). Accordingly, digital inclusion should be understood through the interaction of these factors rather than examined independently.

In light of these perspectives, this study asks: *To what extent does disability status moderate the effect of education on digital access?* As educational expansion and inclusive education continue to be strongly advocated, there remains limited evidence on whether higher educational attainment truly eliminates the digital divide for persons with disabilities or instead allows less visible forms of inequality to persist at higher educational levels.

This study addresses this concern empirically using Taiwan's Digital Access Survey and incorporates van Dijk's (2002) four-stage framework to provide a more comprehensive understanding of different dimensions of digital access, with a particular focus on the interaction between education and disability.

In doing so, this study makes several contributions. Theoretically, it deepens the multi-stage framework of the digital divide by integrating the social model of disability to explain how structural inequalities may unfold across different dimensions of digital access. Practically, it provides evidence to inform policies by addressing the often-overlooked barriers to digital inclusion faced by persons with disabilities. Methodologically, it demonstrates the potential of quantitative analysis in a field where disability research

has traditionally relied more on qualitative approaches, showing how structural inequalities can be examined using large-scale data.

2. Literature Review

2.1. *Digital Divide and Four Stages of Digital Access*

The digital divide refers to disparities in access to digital technologies that may reinforce broader social and economic inequalities, particularly among already vulnerable groups (Vassilakopoulou & Hustad, 2023). While “access” and “digital divide” are widely used terms, they should not be viewed as single-dimensional concepts. To illustrate this complexity, van Dijk (2002) proposed a four-stage framework of digital access:

- *Mental access* refers to individuals’ interest, motivation, and anxiety toward engaging with technology (van Dijk, 2002). Rooted in technology acceptance theories, this suggests that adoption is driven by perceived usefulness and subjective norms, while constrained by technology-related anxiety (van Dijk, 2017).
- *Material access* indicates whether individuals possess digital devices or Internet connectivity, capturing the basic infrastructure required for digital participation. However, access alone does not guarantee meaningful engagement, which requires the consideration of digital skills and actual usage (van Dijk, 2002).
- *Skills access* refers to the capacity and literacy to effectively find, evaluate, and use digital information. Insufficient digital skills may restrict online activities and access to essential services (van Deursen & Helsper, 2015).
- *Usage access* reflects how individuals participate online. Rather than simply indicating whether people use the internet, this dimension captures the breadth and diversity of activities, including key domains such as finance, social interaction, healthcare, and access to government services (Duplaga, 2017; Fayyad & Al-Sinnawi, 2024; Lopez de Coca et al., 2022). van Dijk (2012) argues that limited participation may restrict access to social and economic resources, reinforcing digital inequality.

In sum, these four stages demonstrate that the digital divide is a multidimensional phenomenon, with each dimension reflecting distinct forms of digital inequality.

2.2. *Disability Model and Digital Disability Divide*

Previous research has identified several sociodemographic determinants of digital inequality, including age, gender, income, and educational attainment (Acilar & Sæbø, 2023; Phochai et al., 2024). Among these, educational attainment appears to emerge as one of the strongest predictors of digital inequality (Lythreitis et al., 2022). Nevertheless, digital inequality among persons with disabilities cannot be explained by individual characteristics alone, but it also requires perspectives from disability studies.

When examining inequality among persons with disabilities, two perspectives are frequently discussed: the medical model and the social model (Haegele & Hodge, 2016). The medical model views disability as the result of impairment, attributing it to individual biological, neurological, or physiological deficits. Under this perspective, disability is regarded as undesirable, and individuals are expected to adopt the “sick role” and

cooperate with professionals for rehabilitation (Parsons, 1991). Disability is framed as a “personal tragedy” (Oliver, 1986).

Rather than viewing disability as the result of individual misfortune, the social model argues that the barriers experienced by persons with disabilities are socially constructed. At the macro level, it emphasizes structural barriers, such as attitudes, stigma, and cultural norms that restrict participation across different types of impairment (Deacon et al., 2022; Samaha, 2007). At the micro level, the social relational model highlights how biological differences are intertwined with interpersonal experiences of oppression, which in turn produce negative psycho-emotional impacts on individuals’ lives (Deacon et al., 2022).

Although both models have their advocates, the medical model is often criticized for overemphasizing disability as a personal misfortune, overlooking the social structures that shape inequality (Hogan, 2019). By contrast, the social model suggests that disability is largely shaped by social ideology and cultural structures. As such, “impairment may be a human constant, but ‘disability’ need not and should not be” (Barnes, 2012, p. 12). This perspective provides a clearer foundation for reforms in social policy and cultural change, making disability-related inequalities more amenable to systemic solutions (Dirth & Branscombe, 2017; Oliver, 1996).

Drawing on the social model, the digital divide is shaped by structural barriers rather than individual impairments. However, at the same time, digital technologies may also empower persons with disabilities.

Digital environments can create alternative spaces for self-representation that are less constrained by physical barriers or face-to-face stigma, thereby enhancing social participation and facilitating the claiming of rights (Cocq & Ljuslinder, 2020). Moreover, digital platforms and content creation may foster community belonging while creating opportunities for flexible employment and income generation (Johnson, 2019). The autonomy enabled by digital technologies is therefore particularly important for persons with disabilities.

Nevertheless, the benefits of digital advancement are not equally shared by persons with disabilities, as persistent barriers continue to constrain inclusion. Ableist assumptions rooted in society portray disability as an imperfect form of human existence (Campbell, 2009), while media representations further reinforce these disadvantageous narratives (Cocq & Ljuslinder, 2020; Figuereo-Benítez et al., 2023). Such cultural narratives shape beliefs, stigma, and stereotypes surrounding persons with disabilities, in turn affecting their self-esteem and expected social roles (Deacon et al., 2022). In addition, because technologies are primarily designed for “normal” users, digital accessibility is often overlooked (Beck, 2024). Moreover, digital participation among marginalized groups depends heavily on mainstream institutions, commercially driven platforms, and crowdfunding, making digital inclusion politically and economically fragile (Ellis & Goggin, 2015).

2.3. Contextualisation of the Taiwanese Case

This study was conducted in Taiwan, one of the leading digital societies, ranking 10th globally and 3rd in the Asia-Pacific (IMD World Competitiveness Center, 2025). Alongside its rapid digital transformation, Taiwan has long recognised digital inclusion as a core policy. Since 2005, it has continuously promoted digital accessibility and conducted a nationwide survey specifically for persons with disabilities every three years to monitor inclusion among this population (National Development Council, 2022).

In 2014, Taiwan further strengthened its commitment by voluntarily incorporating the Convention on the Rights of Persons with Disabilities (CRPD) into domestic law despite not being a member of the United Nations. Guided by the CRPD principles, Taiwan has since expanded initiatives promoting accessible websites, inclusive digital public services, and educational initiatives supporting inclusive education, lifelong learning, and digital literacy for persons with disabilities (Ministry of Education, 2023). Despite these policy efforts, whether educational attainment can offset digital inequalities remains unclear. Taiwan therefore provides a valuable context for examining this question.

2.4. Research Gaps in Existing Studies

First, most studies merely control for sociodemographic factors when comparing individuals with and without disabilities (Pettersson et al., 2023; Scanlan, 2022), rather than examining their interactive effects on digital outcomes. Such analysis is critical because structural inequalities and socioeconomic disadvantage may compound one another, placing vulnerable groups at greater risk of digital exclusion (Raihan et al., 2025).

Second, despite growing attention to the second-level digital divide, first-level inequalities remain unresolved and were further exposed during the Covid-19 pandemic (Aissaoui, 2022). A comprehensive understanding of digital inequality requires examining both levels simultaneously.

Third, existing evidence remains geographically and demographically uneven, with most studies focusing on Western countries and relatively few examining disadvantaged populations (Aissaoui, 2022; Raihan et al., 2025).

To address these gaps, this study investigates digital inequality across disability status and educational attainment in Taiwan by integrating the four stages of digital access within a unified framework. In doing so, it provides more nuanced evidence from a non-Western context and demonstrates how overlapping social positions jointly shape digital inequality.

3. Hypothesis

From the perspective of the social model of disability, unequal digital outcomes may persist even among individuals with similar educational attainment because persons with disabilities continue to face inaccessible environments and social oppression (Deacon et al., 2022; Oliver, 1996). At the same time, digital technologies may also compensate for offline barriers and facilitate participation in certain contexts (Chadwick & Wesson, 2016; Suler, 2004). Therefore, rather than assuming that intersecting social positions necessarily produce cumulative disadvantage (Bauer et al., 2021), this study proposes two competing mechanisms explaining how education may be associated with different digital access among persons with disabilities.

Under a “barrier-amplification mechanism,” inaccessibility, costs, and stigma may weaken the benefits of education and widen the disability gap at higher educational levels. In contrast, under a “compensation mechanism,” digital technologies may help persons with disabilities overcome certain offline barriers and translate education into digital engagement despite these constraints. The following sections develop stage-specific hypotheses to assess which mechanism appears more dominant across different forms of digital access.

3.1. Mental Access

Education is widely recognized as a key factor in fostering awareness and positive attitudes toward technology (Phochai et al., 2024; Vicente & López, 2010). However, from a social relational perspective, its effects may operate differently. Research shows that persons with disabilities often report lower digital self-efficacy due to negative social experiences and interpersonal interactions (Partridge, 2007).

Specifically, reliance on assistive technologies reinforces socially constructed disabled identities (Chadwick & Wesson, 2016). Repeated exposure to criticism (Deacon et al., 2022) and overly protective attitudes from caregivers further undermine confidence in online engagement (Lathouwers et al., 2009). Consequently, although education generally enhances motivation and digital readiness, its positive effects may be weaker for persons with disabilities.

H1: The positive association between education and mental access is greater among persons without disabilities than among persons with disabilities.

3.2. Material Access

Higher education is related to higher internet adoption. However, for persons with disabilities, without adequate support and affordable assistive technologies, access to the internet alone is useless (Baumgartner et al., 2023). Consistent with technology acceptance theories, perceived ease of use when learning new technologies can become a major barrier to adoption (Davis, 1989). Anticipated dependence on others for assistance may create feelings of embarrassment or shame among persons with disabilities, leading some to avoid technology use (Baumgartner et al., 2023). In addition, assistive technologies are often essential for effective internet use, yet their costs extend beyond initial purchase expenses to include maintenance, customization, and replacement (Mishra et al., 2024). Consequently, these barriers may continue to constrain technology adoption even among individuals with higher educational attainment.

H2: The positive association between education and material access is greater among persons without disabilities than among persons with disabilities.

3.3. Skills Access

Higher educational attainment is generally associated with better digital skills (van Dijk, 2017). However, even at similar educational levels, learning quality and effectiveness may diverge. Persons with disabilities often require additional support and adaptive resources to fully benefit from education, yet such provisions are frequently lacking due to structural barriers within educational systems (Baumgartner et al., 2023; Stienstra et al., 2007). Thus, while education generally enhances digital literacy, persons with disabilities may face greater difficulties translating educational attainment into proficient digital skills.

H3: The positive association between education and skills access is greater among persons without disabilities than among persons with disabilities.

3.4. Usage Access (Social Usage)

Education is generally expected to promote broader forms of internet use (van Deursen & van Dijk, 2014). Yet, for persons with disabilities, structural barriers may constrain their ability to fully benefit from such opportunities.

Social platforms are often viewed as spaces that help avoid unwelcoming offline environments and promote social interaction. They help increase public awareness (Cocq & Ljuslinder, 2020), as well as promote social and economic participation through online influencer activities (Bonilla-del-Río et al., 2022). However, online spaces and social media are not equally inclusive (Barroso-Moreno et al., 2024). Polarized and hostile environments may reinforce stigma (Anderson, 2023), while persons with disabilities also manage their online expression carefully due to concerns about negative reactions (Bitman, 2021).

Nevertheless, despite the risks and hostility present in some online environments, online interaction still provides net benefits for persons with disabilities by increasing anonymity, reducing face-to-face stigma, and expanding opportunities for social participation (Chadwick & Wesson, 2016; Suler, 2004). Empirical studies further suggest that persons with disabilities tend to spend more leisure time online than those without disabilities (Duplaga, 2017). Given the fundamental need for social connection and the relatively accessible nature of online interaction, social internet use appears to exhibit comparatively smaller participation gaps across disability and educational groups.

H4a: The positive association between education and social usage is not significantly greater among persons without disabilities than among persons with disabilities.

3.5. Usage Access (Financial Usage)

Evidence shows that education improves financial literacy and decision-making (Finke & Huston, 2014). However, for persons with disabilities, the ability to act on this knowledge is often constrained. For example, commercial banks rarely recognize the business opportunities associated with serving persons with disabilities and often fail to prioritize digital accessibility due to profit-driven motives (Fayyad & Al-Sinnawi, 2024; Wentz et al., 2019). Meanwhile, persons with disabilities are often treated in an infantilizing manner or assumed to lack literacy, thereby restricting their access to digital banking (Kameswaran & Marathe, 2023).

As long as financial platforms remain inaccessible and fail to accommodate diverse needs, they prevent persons with disabilities from translating knowledge into actual digital participation. Consequently, although higher education may improve financial literacy, its effects are weaker for persons with disabilities.

H4b: The positive association between education and financial usage is greater among persons without disabilities than among persons with disabilities.

3.6. Usage Access (Healthcare Usage)

Improved literacy generally enhances the ability to utilize health services (Smith & Magnani, 2019), while persons with disabilities may still find certain online healthcare tasks challenging (Pettersson et al., 2023).

Nevertheless, the benefits of eHealth are substantial, and the greater healthcare needs of persons with disabilities may compel them to rely on digital platforms. By improving healthcare access and delivery, eHealth enhances healthcare efficiency and quality (Eysenbach, 2001), while also creating greater decision-making flexibility (Vine, 2020). Patients with long-term health conditions also rely more heavily on online appointment systems due to their need for continuous symptom management (Fischer et al., 2014). Studies further suggest that persons with disabilities are more likely to seek health-related information online (Duplaga, 2017).

Based on the above literature and the present findings, I hypothesize that persons with disabilities may prioritize applying their digital skills and educational resources to healthcare-related engagement. Accordingly, among individuals with similar educational attainment, the educational effect may not differ substantially.

H4c: The positive association between education and healthcare usage is not significantly greater among persons without disabilities than among persons with disabilities.

3.7. Usage Access (Government Service Usage)

As government services become digitalized, bureaucratic encounters increasingly occur online. However, many platforms are designed around assumptions of general usability rather than accessibility (Beck, 2024). Even as co-design and inclusive governance are advocated, limited institutional support and reluctance to share power often leave inclusion merely symbolic (Van Toorn, 2024). Beyond institutional and technological barriers, persons with disabilities may also experience higher psychological costs from perceived discrimination during bureaucratic encounters (Vogel et al., 2025). Serious health conditions often negatively affect executive functioning, reducing individuals' ability to navigate administrative procedures (Christensen et al., 2020). Consequently, although education can promote e-government engagement, persons with disabilities may exhibit lower levels of digital government service usage.

H4d: The positive association between education and government service usage is greater among persons without disabilities than among persons with disabilities.

4. Method

4.1. Data Source and Collection

This study draws on four waves of nationally representative data from the Digital Access Survey, conducted by the Taiwanese government in 2020, 2022, 2023, and 2024. The 2021 wave was suspended due to the Covid-19 pandemic. Since its launch in 2002, the survey has served as Taiwan's primary official survey for monitoring digital development and informing national digital policymaking. Following a major revision in 2020 to reflect the growing international emphasis on digital well-being, subsequent waves have adopted the same survey framework (Ministry of Digital Affairs, 2024), enabling the four waves to be pooled into a single analytical dataset.

These surveys, targeting Taiwanese residents aged 12 and above, were conducted through computer-assisted telephone interviews using random sampling of residential and mobile phone numbers. After excluding observations with missing values on variables used in the analyses, the pooled dataset included 55,289 respondents, of whom 2,307 (4.17%) were officially registered as persons with disabilities, a proportion comparable to the average official disability prevalence of 5.17% in Taiwan over the study period (Ministry of Health and Welfare, 2026). The unit of analysis was the individual.

4.2. Variable Measurement

4.2.1. Dependent variables

All dependent variables are binary indicators, coded as 1 if the respondent reports the specified type of digital access and 0 otherwise.

- (1) *Mental access* captures individuals' attitudes toward digital technology, measured by: "How connected do you feel to current technology trends?"
- (2) *Material access* is assessed by: "Have you ever used a computer, mobile phone, television, tablet, or other information devices to access the internet?"
- (3) *Skills access* reflects individuals' ability to locate, evaluate, and use online information, measured by: "Have you used the internet to purchase products, pay for apps or software, or use services such as food delivery, ride-hailing, or accommodation booking?"
- (4) *Usage access* is measured by four binary indicators, with an affirmative response indicating usage:
 - Social usage: use of instant messaging or social networking platforms to post text, photos, or videos.
 - Financial usage: use of online or mobile banking services.
 - Healthcare usage: use of online appointment systems.
 - Government service usage: accessing government services or information through government websites or apps.

4.2.2. Independent variable (education × disability)

- (1) *Education* is coded as 0 for below senior high school (*low education*) and 1 for senior high school and above (*high education*).
- (2) *Disability* is coded as 1 for persons holding an official disability identification card or certificate and 0 otherwise.
- (3) *Education × disability* is the primary independent variable of interest.

Control variables: *Gender* and *employment* are coded as binary variables (male = 0, female = 1; not employed = 0, employed = 1). *Generation* is classified into four cohorts: Older Generation (1928–1964), Generation X (1965–1980), Generation Y (1981–2000), and Generation Z (2001 and later), following Çoklar and Tatli (2021). *Region* is categorized into Northern, Central, Southern, Eastern, and outlying islands, based on Taiwan's official regional classification. *Survey year* is also included to account for temporal variation across the survey waves. Descriptive statistics are presented in Table 1.

Table 1. Descriptive statistics of the study sample.

Variable		Count	Percentage (%)
Education	Low education	16,067	29.06
	High education	39,222	70.94
Disability	Without disabilities	52,982	95.83
	With disabilities	2,307	4.17
Gender	Male	25,784	46.63
	Female	29,505	53.37
Generation	Older generation (1928–1964)	20,094	36.34
	X Gen (1965–1980)	13,838	25.03
	Y Gen (1981–2000)	12,589	22.77
	Z Gen (2001 and later)	8,768	15.86
Employment	Unemployed	36,191	65.46
	Employed	1,9098	34.54
Region	Northern	19,568	35.39
	Central	10,234	18.51
	Southern	15,662	28.33
	Eastern	4,776	8.64
	Outlying Islands	5,049	9.13
Year	2020	14,900	26.95
	2022	10,867	19.65
	2023	14,753	26.68
	2024	14,769	26.71
Mental access	No access	17,221	34.70
	Has access	32,414	65.30
Material access	No access	10,821	19.57
	Has access	44,468	80.43
Skills access	No access	16,170	36.67
	Has access	27,931	63.33
Social usage	No access	2,250	5.12
	Has access	41,726	94.88
Financial usage	No access	21,490	48.87
	Has access	22,486	51.13
Healthcare usage	No access	24,530	55.78
	Has access	19,446	44.22
Government service usage	No access	26,175	47.34
	Has access	29,114	52.66

4.3. Model Specification and Interpretation

Following the analytical framework illustrated in Figure 1, this study employs a series of logistic regression models to examine digital access. For individual i , the probability of achieving a given type of digital access is modeled as:

$$\text{logit}(P(Y_i = 1|X_i)) = \beta_0 + \beta_1 \text{Education}_i + \beta_2 \text{Disability}_i + \beta_3 (\text{Education}_i \times \text{Disability}_i) + \gamma' Z_i + \delta_t.$$

The dependent variable Y_i is a binary indicator of digital access for individual i . Seven separate models are estimated for different dimensions of access, all using the same model specification.

Education_i represents the educational attainment, Disability_i denotes disability status, and their interaction term captures whether the effect of education on digital access differs by disability status. The vector Z_i represents the control variables, while δ_t denotes year fixed effects.

Since the logit model is nonlinear, interaction effects cannot be appropriately interpreted directly from the coefficient of the interaction term (Ai & Norton, 2003). It is therefore critical to evaluate these effects on an additive scale (Bauer et al., 2021). Following the recommendations of Mize (2019), this study interprets interaction effects using predicted probabilities. The analysis first presents plots of predicted probabilities and examines interaction effects through first differences and second differences, along with statistical significance tests. First differences represent the average marginal effects (AMEs) of education within each

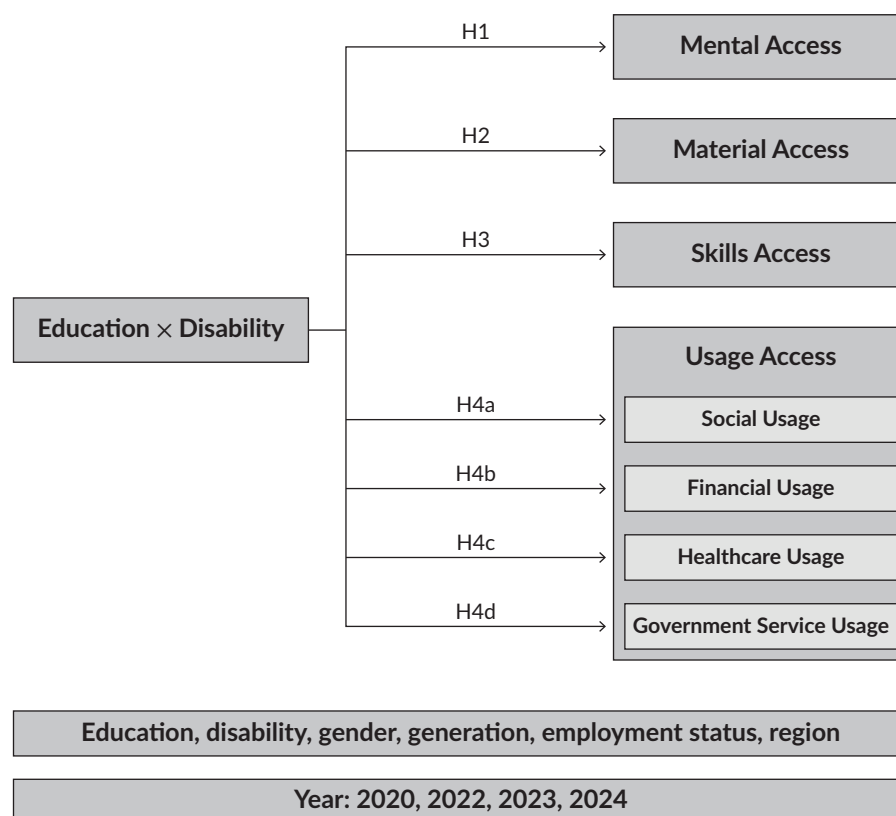


Figure 1. Hypothesis and analytical framework of this study.

disability group, whereas second differences represent differences in AMEs between disability groups. Details of these procedures and additional results are provided in Appendix A of the Supplementary File.

5. Findings

5.1. Mental Access

Results for mental access (Table A1-1 and Table A1-2 in Appendix A of the Supplementary File) show that higher education is associated with higher mental access for persons without disabilities (AME = 0.297, $p < 0.001$) and with disabilities (AME = 0.217, $p < 0.001$). However, the significant second difference (0.081, $p < 0.001$) indicates that the educational effect is 8.1 percentage points larger among persons without disabilities. Figure 2 further shows that the gap remains small at lower education but becomes more pronounced at higher educational levels, supporting H1.

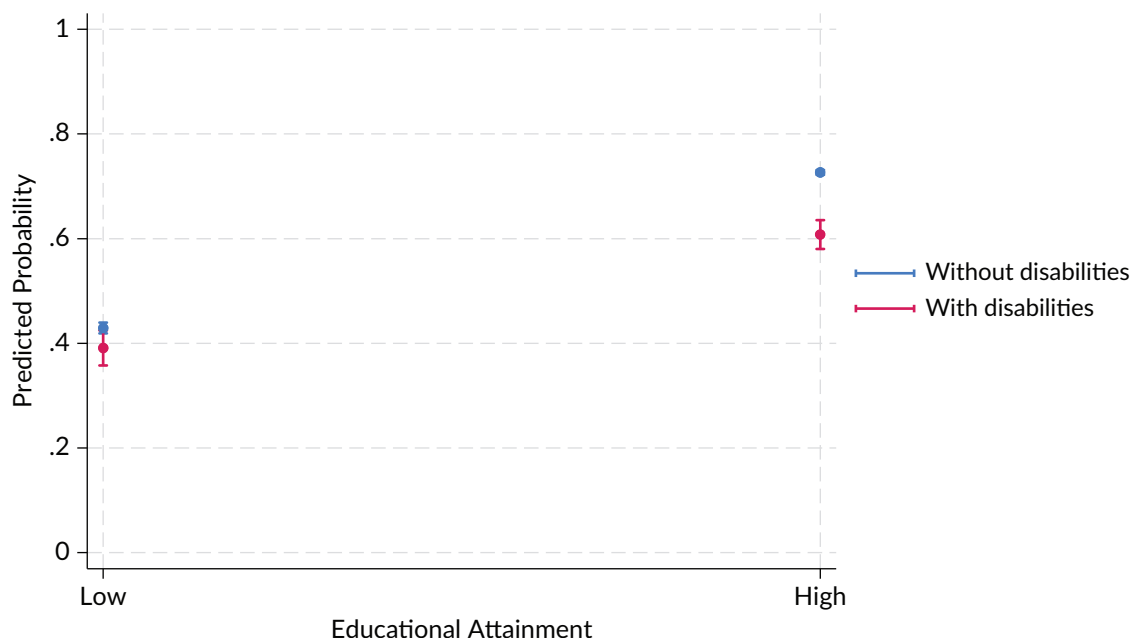


Figure 2. Predicted probability of mental access by education and disability.

5.2. Material Access

Results for material access (Table A2-1 and Table A2-2 in the Supplementary File) reveal that higher education is associated with higher material access for individuals without disabilities (AME = 0.314, $p < 0.001$) and with disabilities (AME = 0.265, $p < 0.001$). Nevertheless, the significant second difference (0.049, $p < 0.001$) suggests that the educational advantage is greater among persons without disabilities, implying that higher educational attainment may widen the disparity between the two groups. Figure 3 similarly shows that differences are limited at lower educational levels but become evident at higher educational levels. These results support H2.

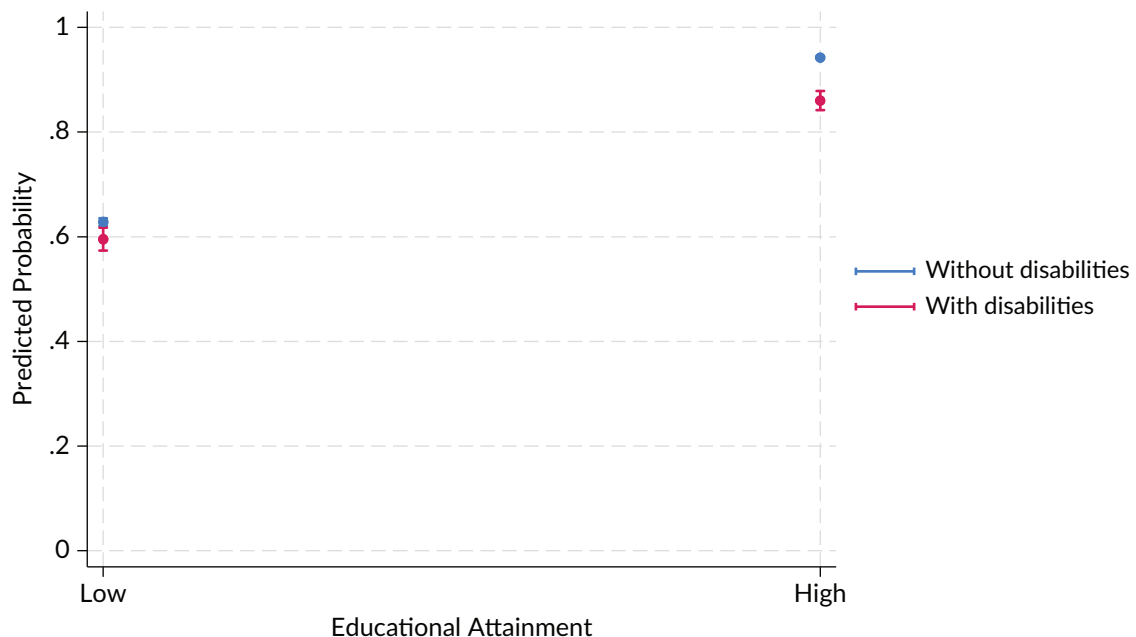


Figure 3. Predicted probability of material access by education and disability.

5.3. Skills Access

Results for skills access (Table A3–1 and Table A3–2 in the Supplementary File) reveal that higher education is associated with higher skills access for individuals without disabilities (AME = 0.345, $p < 0.001$) and with disabilities (AME = 0.195, $p < 0.001$). Nevertheless, the significant second difference (0.149, $p < 0.001$) suggests that the educational advantage is substantially greater among persons without disabilities. Figure 4

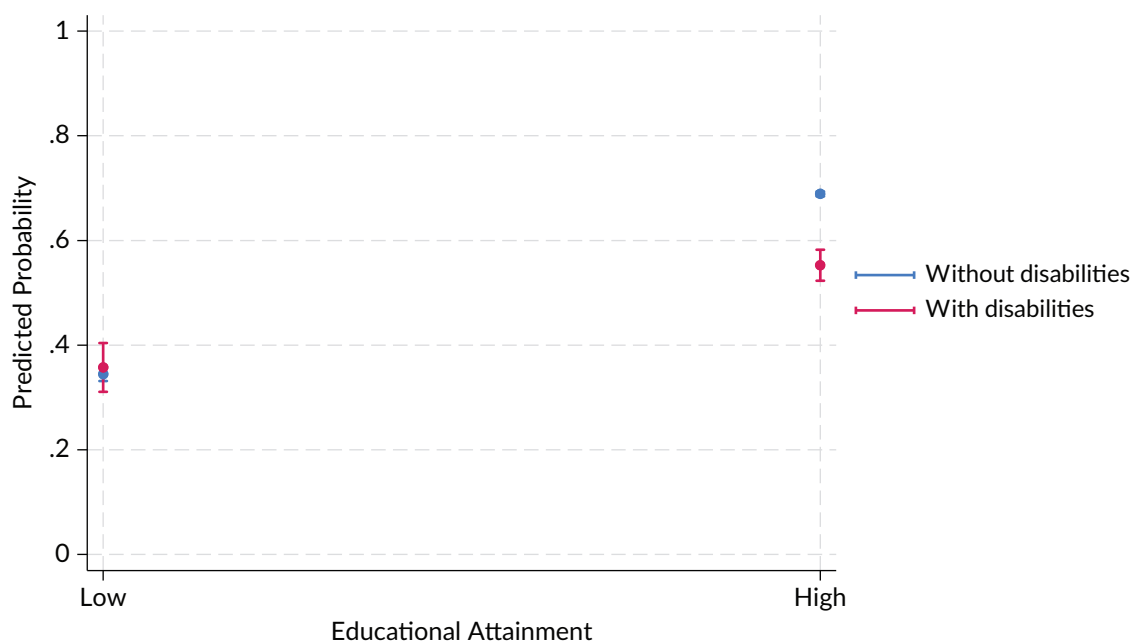


Figure 4. Predicted probability of skills access by education and disability.

also shows that differences become considerably more pronounced at higher educational levels. These results support H3.

5.4. Social Usage

Results for social usage (Table A4–1 and Table A4–2 in Supplementary File) reveal that higher education is associated with higher social usage for individuals without disabilities (AME = 0.045, $p < 0.001$) and with disabilities (AME = 0.040, $p < 0.01$). However, the second difference is not significant (0.005, $p > 0.05$), suggesting that the educational effects on social usage are relatively similar across disability groups. Figure 5 likewise shows overlapping patterns across disability groups. These findings failed to find evidence of widening gaps between people with and without disabilities, which supports H4a.

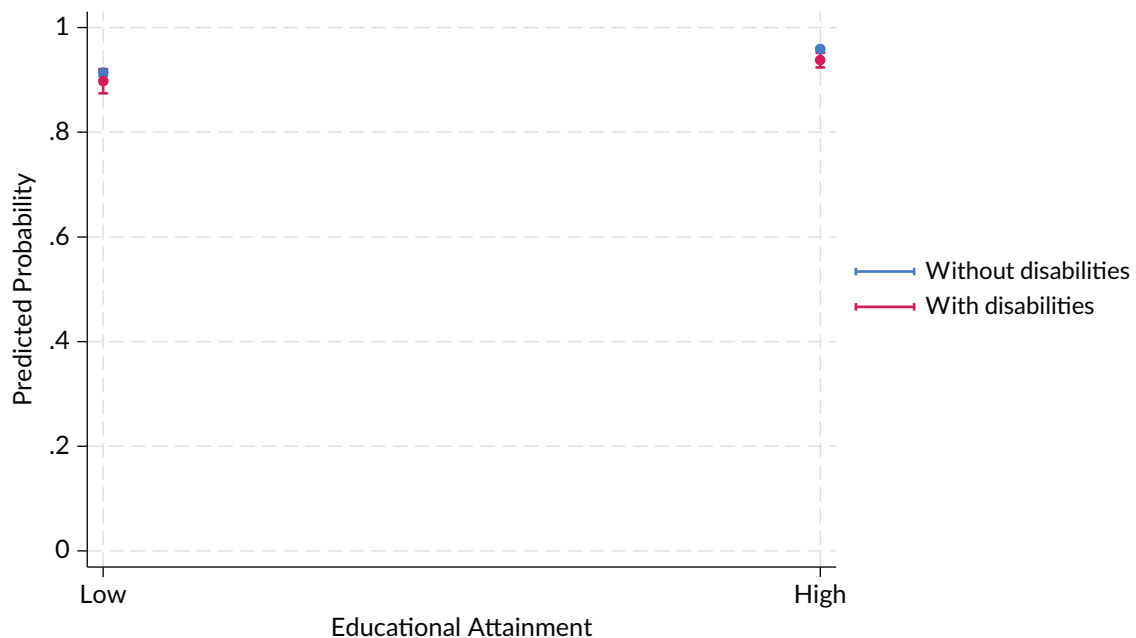


Figure 5. Predicted probability of social usage by education and disability.

5.5. Financial Usage

Results for financial usage (Table A5–1 and Table A5–2 in the Supplementary File) reveal that higher education increases financial usage for both individuals without disabilities (AME = 0.419, $p < 0.001$) and with disabilities (AME = 0.211, $p < 0.001$). Nevertheless, the significant second difference (0.208, $p < 0.001$) suggests that the educational advantage is substantially greater among persons without disabilities. Figure 6 similarly shows that differences become more pronounced at higher educational levels. These results support H4b.

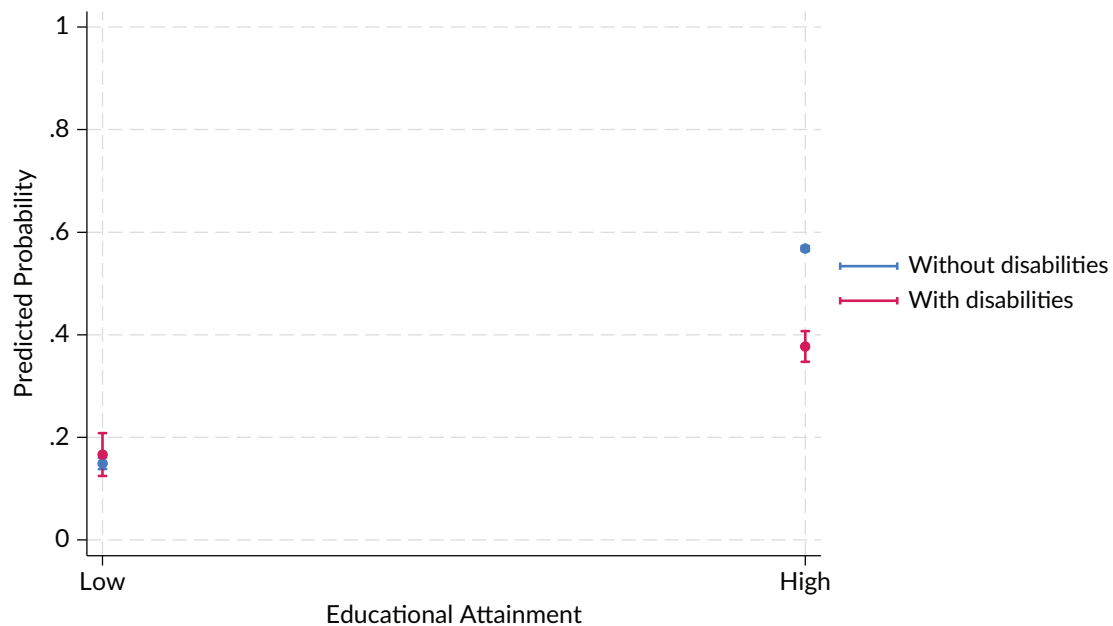


Figure 6. Predicted probability of financial usage by education and disability.

5.6. Healthcare Usage

Results for healthcare usage (Table A6–1 and Table A6–2 in the Supplementary File) reveal that higher education increases healthcare usage for both individuals without disabilities (AME = 0.297, $p < 0.001$) and with disabilities (AME = 0.249, $p < 0.001$). However, the second difference is not statistically significant (0.049, $p > 0.05$), suggesting that the educational effect on healthcare usage is relatively similar across disability groups. Figure 7 likewise shows almost no differences across disability groups. These findings failed to find evidence of disparity, therefore supporting H4c.

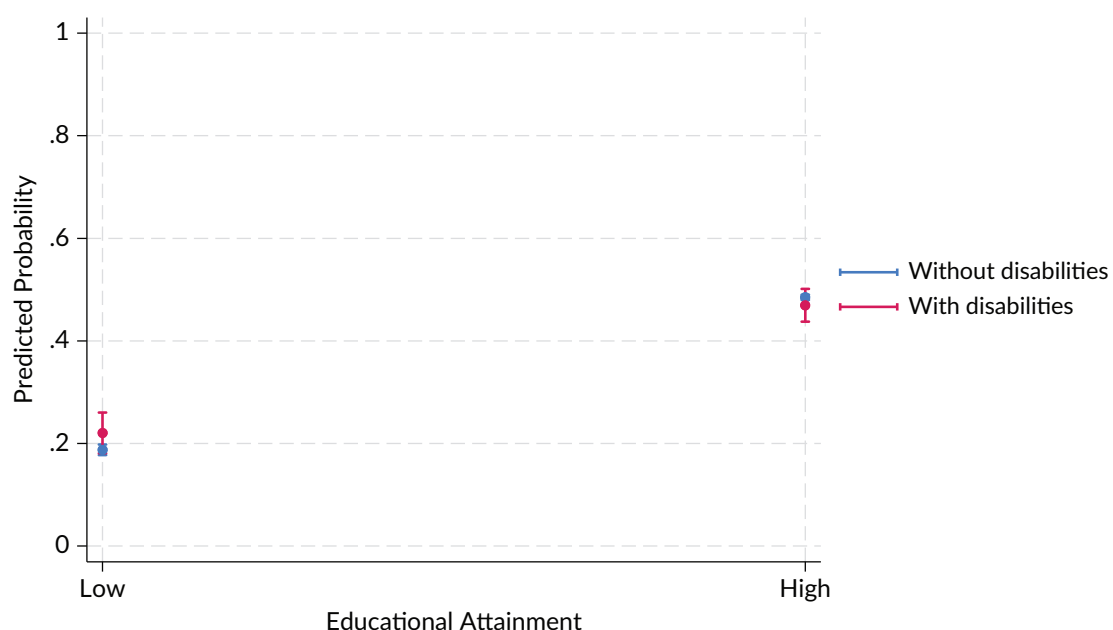


Figure 7. Predicted probability of healthcare usage by education and disability.

5.7. Government Service Usage

Results for government service usage (Table A7–1 and Table A7–2 in the Supplementary File) reveal that higher education increases government service usage for both individuals without disabilities (AME = 0.454, $p < 0.001$) and with disabilities (AME = 0.341, $p < 0.001$). Nevertheless, the significant second difference (0.113, $p < 0.001$) suggests that the educational advantage is greater among persons without disabilities. Figure 8 similarly shows that differences become more pronounced at higher educational levels. These results support H4d.

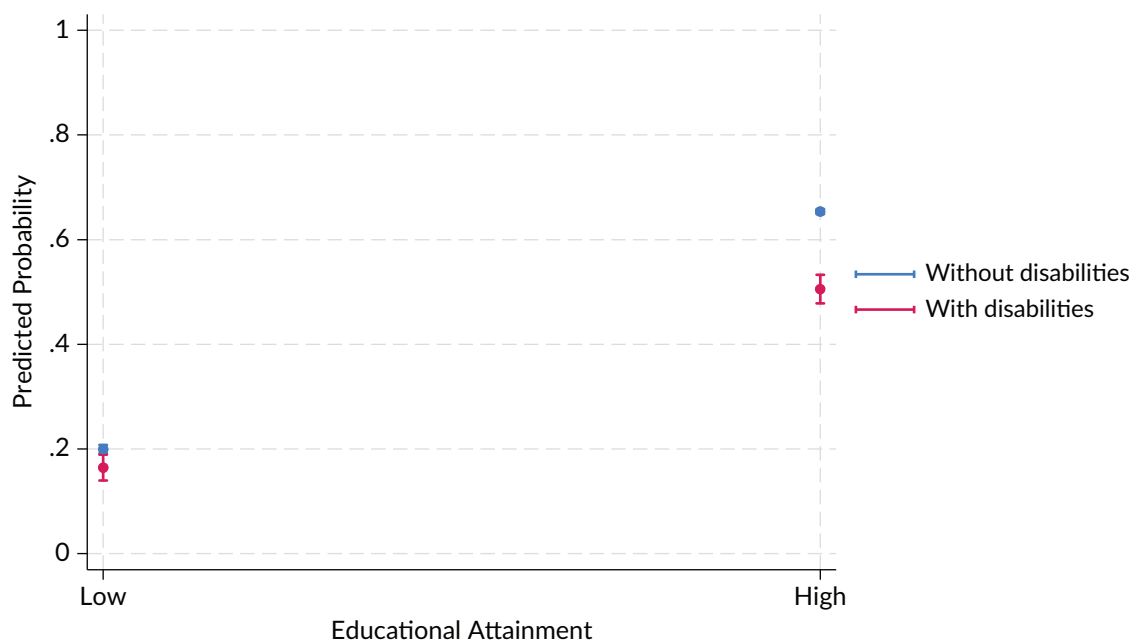


Figure 8. Predicted probability of government service usage by education and disability.

Overall, the findings suggest that while education generally improves digital access, its benefits may be less pronounced for persons with disabilities at higher educational levels. The following sections further elaborate these patterns.

6. Discussion

Before discussing the findings, it is important to note that the measures in this study primarily capture basic forms of digital access rather than deeper forms of digital engagement. The findings therefore likely provide a conservative estimate of the digital divide, as individuals lacking basic access are less likely to achieve meaningful digital participation.

The patterns observed in these findings raise a broader question regarding the extent to which education can function as an equalizing force in digital inclusion. Across most dimensions of digital access, including mental, material, and skills access, as well as usage access related to financial and government services, the interaction effect between disability and education is statistically significant. These results indicate that although higher education improves digital access for both groups, the educational advantage appears to be greater for persons without disabilities in general.

Conversely, different patterns emerge for social and healthcare usage, where the interaction effects are not statistically significant. This suggests that educational advantages in these two domains may be relatively similar between persons with and without disabilities. One explanation is that when digital services are highly necessary or provide substantial benefits, persons with disabilities may have stronger motivation to engage, potentially reducing disparities associated with educational attainment.

For social internet use, the internet may mitigate offline inequalities by providing greater anonymity and greater control over how and when to present their “true self.” This “online disinhibition effect” helps reduce social stigma and, in turn, increase the likelihood of social participation (Furr et al., 2016; Suler, 2004). This fundamental human need for social connection helps explain why digital disparities may be less pronounced in this domain.

Similarly, the absence of a significant disability gap in healthcare-related internet use in Taiwan suggests that greater healthcare needs may encourage individuals to seek health-related information and services online. This interpretation is consistent with previous studies showing that healthcare needs may, to some extent, promote engagement with digital health services among persons with disabilities (Dobransky & Hargittai, 2006; Duplaga, 2017). However, this pattern contrasts with findings from Sweden, where persons with disabilities were found to use eHealth services less frequently than those without disabilities (Pettersson et al., 2023), suggesting that this relationship may vary across contexts.

Notably, although the interaction between disability and education is not statistically significant for either social or healthcare-related internet use, the two domains exhibit distinct patterns. As shown in Figures 5 and 7, social usage remains consistently high across educational groups for both persons with and without disabilities, with predicted probabilities approaching saturation at around 90% (Table A4–2 in the Supplementary File). Accordingly, the marginal effect of education is relatively limited, increasing participation by only about 4% (first differences: 0.045, $p < 0.001$ and 0.040, $p < 0.01$).

In contrast, healthcare usage shows a much stronger educational gradient. Although the disability gap does not significantly widen at higher educational levels, higher education is associated with greater healthcare-related engagement for both groups, with marginal effects of around 25% (Table A6–2 in the Supplementary File: 0.297, $p < 0.001$ and 0.249, $p < 0.001$). These findings suggest that the non-significant interaction effects may arise through different mechanisms across domains. Whereas social internet use is already close to universal regardless of educational attainment, healthcare-related internet use remains substantially shaped by education.

Nevertheless, although social and healthcare domains show relatively equal participation across disability status, broader findings suggest that the digital disability divide may persist or even become more pronounced at higher educational levels. One explanation is that ableist assumptions often portray persons with disabilities as neither needing nor being capable of achieving the same professional outcomes as their non-disabled peers, and once institutionalized, even within the same classroom, such assumptions may limit access to educational resources (Gorski & Clark, 2002). Moreover, repeated usability difficulties and discouraging evaluations from surrounding social networks may further reduce their willingness to engage with digital environments (Dobransky & Hargittai, 2006). In this sense, what truly disables individuals is not the impairment itself, but social systems and institutional arrangements designed primarily around the needs of the majority while neglecting those with impairments (Cocq & Ljuslinder, 2020).

This interpretation also resonates with evidence from Taiwan. The structural barriers faced by people with disabilities may be reflected in what Hong and Li (2025) describe as the “masking effect” in Taiwan’s special education system, whereby educational institutions focus excessively on students’ disabilities while overlooking their strengths and potential, consequently limiting opportunities for appropriate skill development. Likewise, although Taiwan has actively promoted digital education, including programming, computational thinking, and cloud-based learning (Kuo et al., 2023), students with disabilities, particularly those in inclusive classrooms, still receive insufficient differentiated support because mainstream teachers often lack adequate preparation in special education (Hong & Li, 2025).

In light of these findings, broad educational initiatives should adopt more adaptive and disability-responsive strategies, while systematically identifying and removing structural barriers across family, school, and broader sociocultural contexts to ensure substantive opportunities for participation (Kuo et al., 2024; Su, 2026). Beyond strengthening external support, interventions should also incorporate identity reconstruction, helping students reframe disability labels as personal characteristics and fostering psychological resilience (Kuo et al., 2024). Recent advances in AI and assistive technologies also show promise in complementing these efforts by providing more personalized and scalable solutions to improve digital inclusion (Putri et al., 2025).

7. Conclusion

From the perspective of the social model, disability is shaped not only by individual impairments but also by structural barriers that fail to accommodate diversity, making it not merely a medical issue affecting a minority population, but also a broader social issue tied to civil rights and inclusion (Barnes & Oliver, 1993). As such, digital inequalities faced by persons with disabilities cannot be understood solely through differences in physical condition or educational attainment. This study therefore examines how disability status and educational attainment interact to shape unequal digital access.

For educational attainment alone, the finding that higher education generally improves digital access echoes prior literature (Lythreath et al., 2022). More importantly, when disability status and education are considered jointly, this study further finds that the educational advantages appear stronger for individuals without disabilities, consistent with the argument that an excessive emphasis on individual capability may overlook the deeper social determinants shaping digital exclusion (Van Toorn & Cox, 2024). Furthermore, by examining multiple dimensions of digital access, the findings reveal that the digital disability divide varies across domains, highlighting the importance of adopting a multidimensional perspective.

Taken together, this study contributes to the literature in several ways. First, drawing on the social model of disability, it demonstrates how this theoretical perspective can be operationalized in large-scale quantitative research by examining the combined role of disability and education in digital inclusion. Second, by investigating digital access across four stages spanning both the first and second-level digital divides, this study uncovers more nuanced patterns of digital inequality. Finally, this study extends the predominantly Western literature by providing empirical evidence from Taiwan, demonstrating that digital inequality still remains a critical issue even in a highly digitalized society.

8. Limitations and Future Research

While using the government survey offers several advantages, secondary data also involve important limitations. First, although the disability subsample was broadly comparable to the national prevalence, it remained slightly underrepresented, which should be acknowledged when interpreting the findings. Moreover, the cross-sectional design limits causal inference, and some variables may not fully capture the dimensions of digital access. For example, healthcare access is measured only through online appointments, while mental access is proxied by perceived connectedness to technological trends rather than direct measures of digital motivation or technology anxiety in van Dijk's (2002) framework, though it still reflects psychological orientation toward technologies. Additionally, the survey does not include direct income measures, and employment status is therefore used as a partial proxy for economic conditions.

Moreover, while this study adopts a macro-level perspective by treating disability as a broad category, different impairment groups may encounter distinct accessibility barriers across specific types of digital services (Johansson et al., 2021; Pettersson et al., 2023). Future research should therefore examine how different impairment types shape heterogeneous patterns of digital access and participation among persons with disabilities, thereby providing a more nuanced understanding of digital inequality across disability subtypes.

Finally, the heterogeneous patterns of digital access observed across disability and education broadly echo the perspective of intersectionality theory, which suggests that overlapping inequalities may produce within-group variation (Atewologun, 2018; Hudson et al., 2024). However, although the present study moves beyond examining a single social position and thus comes closer to an intersectional perspective, regression models with interaction terms remain limited in capturing the complexity of high-dimensional intersectionality. A more comprehensive analysis would require approaches that incorporate multiple social positions, such as latent variable or clustering methods, with further applications in longitudinal and multilevel analyses and effect-measure modification (Bauer et al., 2021). These methodological advances have the potential to enrich digital divide research, where quantitative applications of intersectionality remain limited (Husain et al., 2022).

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Conflict of Interests

The author declares no conflict of interest.

Data Availability

The datasets analyzed in this study were obtained from the Survey Research Data Archive (SRDA).

LLMs Disclosure

The author acknowledges the use of ChatGPT for assistance with grammar and wording suggestions.

Supplementary Material

Supplementary material for this article is available online in the format provided by the author.

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Climate Migration on the Southern Border: Narrative Fragmentation and Structural Silences in the Press

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Abstract

The intersection between climate change and human migration is emerging as one of the most complex challenges facing humanity in the 21st century. In the current context of increasing extreme weather phenomena, social polarization, and political debate on migration, it is crucial to construct media narratives that promote the “right” social understanding of climate migration. The current research analyses media discourse on the topic at the Southern border of Europe in 2025. Using a methodological approach that combines content analysis with critical discourse analysis, this study examines the prioritisation of information, interpretative frameworks, and strategies employed by six leading newspapers in Spain, namely *El País*, *elDiario.es*, *El Mundo*, *ABC*, *Canarias7*, and *Diario Sur*. The results show that the press decontextualises climate migration, portraying it in remote scenarios and prioritising the voices of institutions over those of the victims themselves. This narrative generates a “climate paradox,” understood as a contradiction that highlights external vulnerability whilst concealing industrial causes, avoiding delving deeper into the debate on the need for legal and structural reforms. The phenomenon is thus reduced to an isolated biophysical problem or an aesthetic drama, reinforcing a bureaucratic view that sidesteps transnational climate and financial justice.

Keywords

climate migration; discourse analysis; journalistic frameworks; media coverage

1. Introduction

Climate change is having an unstoppable effect on our planet’s ecosystem and living conditions for humans, forcing a growing number of people to leave their homes. International organisations, such as the United

Nations, through the International Organization for Migration (IOM, 2024) and the High Commissioner for Refugees (UNHCR, 2024), have raised the global alert level, pointing out that environmental degradation and extreme weather events have become the main drivers of forced displacement. In fact, leading statistical reports, such as the *Global Report on Internal Displacement* (Internal Displacement Monitoring Centre, 2024), document that, in the last year on record, natural disasters triggered 56% of new internal displacements globally (more than 26.4 million people), surpassing even those caused by armed conflicts. The report highlights the decisive influence of the climate emergency on these figures, as 77% of these disaster-related displacements were directly caused by extreme weather events, such as severe flooding and prolonged droughts. In this scenario, Spain, due to its geographical location as Europe's Southern border and its proximity to the Atlantic, Mediterranean Sea, and Alboran Sea migration routes, stands out as a key territory where climate vulnerability and intensive border management converge.

Media coverage of climate-induced displacement is sporadic and alarmist worldwide, particularly given the proliferation of headlines about “millions of climate refugees” and rushed research seeking to confirm this narrative (Beine & Jeusette, 2021; Hoffmann et al., 2021; Turner et al., 2025). Similarly, general climate communication tends to be geographically biased towards the Global North, theoretically narrow, and methodologically limited. This results in partial views of climate migration (Agin & Karlsson, 2021), reinforced by narratives that depict migrants as threats, passive victims, or proof of climate collapse (Bonneux & Van Praag, 2024; Sakellari, 2021), rarely incorporating climate justice and human rights frameworks (Estok, 2023; Łódzki & Kocierz, 2025).

Therefore, the influence of media representation on public opinion requires further research, as it can reinforce fear and xenophobia or, conversely, empathy and hospitality (Bonneux & Van Praag, 2024; Łódzki & Kocierz, 2025). Furthermore, the effects it has on policies that prioritise border security over mobility rights (Estok, 2023; Sakellari, 2021), and the promotion of invisibility of all the causes of forced migration—which leads to climate being seen as the sole cause and obscures structural inequalities and responsibilities (Beine & Jeusette, 2021; Estok, 2023; Sakellari, 2021; Turner et al., 2025)—deserve closer examination.

Thus, the central purpose of this research is to analyse the discursive construction that the Spanish press, both nationally and regionally, makes of the causal link between the climate emergency and human mobility in the context of Europe's Southern border during the year 2025. To achieve this end, this study is structured around four fundamental axes. First, it evaluates the prominence of the terms “climate migrant” and “climate refugee,” based on the premise that their omission from the media agenda hinders the crystallisation of the concepts in the collective imagination. Secondly, it examines the pieces where both phenomena converge to determine whether the media establishes an explicit causal relationship or, on the contrary, presents them as isolated crises under a structure of thematic silos. Third, this research compares the interpretative frames of the mainstream national press with those of the border territories—specifically the Canary Islands and Andalusia—to detect possible narrative asymmetries. Finally, it scrutinises the anchoring or displacement mechanisms (spatial, temporal, and symbolic) employed by the newspapers to discern whether the issues reported are linked to the immediate territorial reality or if they are projected onto remote geographical and temporal contexts, thus diluting the urgency of the phenomenon in the immediate environment.

To address these questions, the study employs a mixed-methods design combining content analysis (Krippendorff, 2019)—a technique used to systematically, objectively, and quantitatively describe the overt

content of communication—and critical discourse analysis (CDA; Van Dijk, 2009)—which examines how abuse of power and social inequality are reproduced, legitimized, and perpetuated in communication. This allows analytical triangulation between the structural relevance of the texts and their ideological content.

Six newspapers were selected for the analysis, based on the criteria of audience, geographical relevance, and editorial lines. The sample was divided into taxonomic axes to contrast the regional press of the Southern border (*Canarias7* and *Diario Sur*), with the national progressive-leaning (*El País* and *elDiario.es*), and the conservative press (*El Mundo* and *ABC*). In the initial phase, the prominence of the sample ($N = 78$) is quantified and classified by examining information hierarchy variables, namely authorship, section, and scope. In the subsequent phase, the framing (Entman, 1993) is deconstructed, and the strategies of “moral distancing” or invisibility in the face of displacement in the Global South (Chouliaraki & Georgiou, 2022) are examined.

The core findings reveal a fragmented and asymmetrical narrative characterised by what might be termed “structural silences”—the systematic omission of the underlying political and industrial causes that drive the crisis. Quantitatively, the data show a clear dominance of the national press, which tends to take the phenomenon out of context by projecting it onto remote geographical areas, thereby triggering a strategy of moral distancing—a psychological and discursive mechanism that reduces the audience’s sense of responsibility by framing the suffering of others as distant and unrelated to their own reality. This process effectively dilutes local urgency. Qualitatively, the analysis identifies a “climate paradox”: whilst the media highlight the vulnerability of the Global South (particularly Africa), they systematically omit the industrial and financial responsibilities of the Global North, presenting the crisis as an exogenous disaster rather than a matter of international justice. The findings suggest that the use of high-impact emotional terms, such as “climate refugee,” coexists with a profound legal and political vacuum, where the migrant is frequently portrayed as a passive object of administrative management rather than an individual with the capacity for political action.

2. Climate Migration and the Press: Background and Key Concepts

2.1. Representation of the Phenomenon in the Press

Apocalyptic and catastrophic language predominates in European and Australian newspapers. Water metaphors such as “waves” or “flows” of millions of refugees are frequently used, linking migration with instability and conflict (Hartmann, 2010; Russo, 2017). This approach fuels the securitisation of the phenomenon—by linking climate migrants with risk and border vulnerability, it justifies the reinforcement of militarised responses and indirectly encourages xenophobia (Hartmann, 2010; Sakellari, 2019).

Migrants are often portrayed as anonymous masses or racialised “others,” omitting the context of the economic and political drivers that interact with climate-related causes (Giacomelli & Cappi, 2025; Herrmann, 2017). Western media and even NGOs tend to talk about refugees without giving them space to speak for themselves, as evidenced by the BBC’s coverage. Conversely, media outlets, such as Al Jazeera, which adopt a more personal approach, have been accused of perpetuating the cliché of “strangers sinking” in the Third World (Høeg & Tulloch, 2018).

In the specific case of Spain, research findings differ. Prieto-Andrés et al. (2025) argue that, although the coverage is limited, when it appears in the mainstream press, it tends to be analytical, empathetic, and not particularly focused on danger, which sets the Spanish media framework apart from other European countries. However, other authors identify a greater association between frames of victims and threat/invasion, with an extended use of dehumanising metaphors (waves, avalanches, economic burden, etc.) about refugees (Alcaraz-Mármol & Soto-Almela, 2020; Amores et al., 2019; Ferrández-Ferrer, 2021; Montagut & Moragas-Fernández, 2020). In other countries, such as the United Kingdom, Italy, and Poland, the discourse of catastrophe, crisis, and panic predominates, presenting climate migration as an inevitable and threatening flow towards the Global North (Bonneux & Van Praag, 2024; Estok, 2023; Sakellari, 2019).

2.2. Terminological Tension With the Concept of “Climate Refugee”

The media act as indispensable mediators that not only reflect reality but also construct the interpretative frames through which citizens and institutions understand and legitimise political responses. In this sense, the consolidation of sociological and legal categories such as “climate migrant” or “climate refugee” is essential. Despite the urgency of recognizing the condition of climate-related migration and refuge, a profound terminological tension prevails. While international law, under the 1951 Geneva Convention (1951 Convention Relating to the Status of Refugees) and the 1967 Protocol, does not formally recognise the status of “climate refugee,” the term has gained enormous social traction. However, studies such as that by Jiménez-Gómez et al. (2025) support international legal backing for those affected through the concept of “particular social group” mentioned in the 1967 Protocol.

Neither the UNHCR nor the IOM endorses the use of “climate refugee” as a legal category. This resistance is not merely semantic but rather a legal preservation strategy in the face of a vacuum in international law (Kocierz, 2024; Lulić et al., 2023). Under the Geneva Convention, people displaced strictly by climate factors do not meet the requirements of persecution or conflict necessary to obtain refugee status (Eksi, 2023; Sritharan, 2023).

For this reason, UNHCR explicitly rejects the term “climate refugee” and opts for technical circumlocutions such as “people displaced in the context of disasters and climate change” or “environmentally induced persons” (Del Álamo Marchena, 2021; Lulić et al., 2023). Even in its official clarifications, the agency alerts that using “refugee” for this group could dilute the protections afforded to those fleeing violence, creating legal confusion that states could exploit to curtail existing rights (Keyes, 2019; McEldowney & Drolet, 2021).

For its part, the IOM has been instrumental in shifting the language towards the category of “climate migrant.” Its approach is more inclusive but less binding: it defines an “environmental migrant” as someone who is forced or chooses to move due to progressive or sudden environmental changes (Del Álamo Marchena, 2021; Lulić et al., 2023). By adopting the concept of “migrant,” the IOM strips the subject of the political burden of asylum and places it in the realm of mobility management and resilience (Kocierz, 2024).

The fundamental reason why both agencies avoid the term “climate refugee” is the risk of collision with the current asylum regime. Formally recognising this term would imply a renegotiation of international treaties, which, in the current political climate, could result in less protection for all displaced persons (Hiraide, 2022; Sritharan, 2023). Although UNHCR and IOM recognise climate displacement as one of the most serious

protection challenges of the century, they operate under calculated ambiguity. They use the term “climate refugee” in advocacy forums (such as COPs) to generate urgency, but use official terms such as “climate migrants” or “displaced persons” in their technical guidelines so as not to alter the status quo of international law (Eksi, 2023; Kocierz, 2024).

2.3. Spain as the Southern Border of the EU

Despite the scarcity of statistical data on “climate migration,” Spain receives a significant proportion of migratory flows, with climate change being just one of many factors contributing to these movements. The geographical areas under discussion include the Sahel, West Africa, and the Mediterranean (Balsari et al., 2020; Enríquez-de-Salamanca, 2022).

The Canary Islands–Sahel and the Strait of Gibraltar/Ceuta–Melilla routes are described as critical areas where poverty, instability, and environmental degradation converge, and where Spain acts as the EU’s external border (Del Valle Gálvez, 2023; Enríquez-de-Salamanca, 2022). In the Strait of Gibraltar and the Canary Islands, migration policy is conceived as European border control, marked by externalisation policies towards Morocco and other countries and using migration as a “political weapon” in bilateral conflicts (Del Valle Gálvez, 2023). More generally, research shows that tightening borders in rich countries increases climate vulnerability by “trapping” people who could use migration as a means of adaptation in high-risk areas (Benveniste et al., 2020; McLeman, 2019).

As for coverage of specific areas such as Ceuta, Melilla, or the Canary Islands, some studies suggest that many Spanish media outlets follow a security- and bureaucracy-focused script, with emphasis on numbers, expressions such as “jumping the fence,” “waves,” and photos that dehumanise and criminalise migrants (Ali, 2024; Aranguren, 2024). This situation has been denounced by various specialised journalists in Spain, Italy, and Greece, who highlight that current border reporting focuses on conflict, violence, and police control, with little direct input from migrants and a strong political agenda (Arcila-Calderón et al., 2021).

Spain can be considered the EU’s premier migration laboratory due to its unique land borders with Africa and a proactive foreign policy. Unlike Italy or Greece, Spain uses bilateral diplomacy with Morocco and Senegal as a strategic tool. Furthermore, its progressive stance on mass regularisation and mandatory solidarity distinguishes it from its Mediterranean neighbours.

2.4. Climate Migration as a Factor of Vulnerability to Human Trafficking

The nexus between climate change, migration, and trafficking is being increasingly addressed by researchers, as environmental degradation drives people to move, and in the process, the risks of exploitation—including trafficking—increase, especially for women, girls, and young people.

The climate acts as a “threat multiplier”: droughts, crop failures, floods, and natural disasters exacerbate poverty, violence, and institutional collapse, forcing internal and cross-border migration (Balsari et al., 2020; Ferris, 2020; Huber et al., 2023; Kaczan & Orgill-Meyer, 2019; McLeman et al., 2019). When tightened borders and few legal routes are combined, migration becomes more desperate and controlled by criminal organizations, increasing kidnappings, extortion, and trafficking along the routes (Bates-Eamer, 2019;

Doering-White et al., 2024; Mugambiwa & Sibanda, 2025; Oswald, 2023). Examples of this include the Dry Corridor of Central America (Huber et al., 2023; Oswald, 2023), the Sundarbans region of India (Molinari, 2017; Thangavelu, 2025), sub-Saharan Africa (Nagy et al., 2024; Sheu et al., 2021), and rural Cambodia (Phon & Price, 2024).

Therefore, climate change does not generate trafficking on its own, but it intensifies the conditions (poverty, forced displacement, hard borders, and gender-based violence) that make many climate migrants extremely vulnerable to human trafficking, especially on long and militarised routes. Similarly, other dangers encountered during the journey, such as difficulty accessing basic services such as water, sanitation, or medical care (Schwerdtle et al., 2021), are rarely reflected in the media.

3. Methodology

3.1. Research Objectives

This research analyses how the Spanish press presents the link between climate change and human mobility in Europe's Southern border in 2025, paying special attention to narrative differences between national newspapers and those in directly affected territories.

First, the explicit presence or absence of the terms “climate migrant” and “climate refugee” in the media agenda is addressed, based on the premise that the lack of use of these terms prevents the concept from gaining traction in the public's understanding. Second, those pieces where the themes of “climate change” and “migration” converge are explored to determine whether the media establishes a causal relationship between the two or, on the contrary, whether they juxtapose them as isolated and compartmentalised crises (thematic silos). Third, the interpretative frames used by the national mainstream press are compared with those used by the regional press in the border territories (Canary Islands and Andalusia). And fourth, the discursive mechanisms of anchoring or displacement (spatial, temporal, and symbolic) are detected. These mechanisms explain how the media situate the phenomenon of climate migration, determining whether the issue is linked to the immediate territorial reality or whether it is projected onto other geographical and temporal contexts.

3.2. Research Design

The mixed methodological design that combines quantitative content analysis and CDA allows, in a first phase, to measure the prominence, frequency, and structural location of the texts in the media ecosystem (quantitative dimension) and, in a second phase, to deconstruct the frames, distancing strategies, and underlying ideological bias in journalistic narratives (qualitative dimension).

For the first structural and quantitative level, content analysis (Krippendorff, 2019) is used to quantify the relevance of the sample. Variables of information hierarchy (authorship, section, scope, type of piece) are examined. Next, the interpretative frameworks used by the media to give meaning to the climate-migration nexus are identified in order to examine the framing (Entman, 1993).

To complete the interpretation, this study employs CDA, incorporating recent contributions to the field of mediatisation of borders that highlight the way journalistic discourse establishes regimes of visibility or invisibility, and applies strategies of “moral distancing” or geographical externalisation, in response to displacement from the Global South (Chouliaraki & Georgiou, 2022).

The design takes on a comparative approach through a double analytical triangulation: on the one hand, it contrasts the territorial axis (hegemonic national press versus regional newspapers from the Southern Border) and, on the other, it examines the editorial axis (progressive versus conservative media). This cross-sectional structure responds to the demands of academic literature on climate mobility (Nash, 2019; Sakellari, 2021), which emphasises that the discursive consolidation of the figure of the “climate refugee” is not homogeneous. Instead, it is strongly conditioned by logistical proximity to the border and by the tactical use of scepticism as a tool of political polarisation.

3.3. Corpus and Sample

The period of analysis ranges from 1 January to 31 December 2025—a key year marked by anticipation surrounding COP30 and continued tension along migration routes to Europe. Another factor that contributed to the choice of 2025 as the period under review was the increased media attention on climate migration and the need for protection measures generated by the Tuvalu case.

To ensure a comprehensive representation that allows for the territorial and ideological comparison of the press, the sample of six Spanish newspapers is divided into three taxonomic axes:

1. Territorial axis (regional press on the Southern border): newspapers located in territories that are simultaneously hotspots for water/climate stress and the main gateway for migration. In this case, the *Canarias*⁷—newspaper of reference on the Canary Islands for the Atlantic Route—and *Diario Sur* (leading newspaper on the Andalusian coast for the Alboran Sea Route);
2. Editorial axis A (progressive national press): *El País* (leading national newspaper in Spain, centre-left leaning) and *ElDiario.es* (native digital media outlet with a marked progressive editorial line and a strong focus on human rights);
3. Editorial axis B (conservative national press): *El Mundo* (leading generalist newspaper on the centre-right spectrum) and *ABC* (traditional conservative newspaper).

3.4. Data Collection Process

The corpus was extracted through the My News portal in two sequential phases:

1. Explicit search based on terminology: Boolean operators were used for exact matches with the terms “climate migrant,” “climate refugee,” “climate migrants,” “climate refugees,” “climate migration,” or “climate displaced persons.”
2. Search for co-occurrence and silos, aimed at locating pieces where both topics converge to observe their degree of relationship or juxtaposition. The Boolean formula was used: “climate change,” “climate crisis,” “COP30,” and “migration,” “migrants,” or “refugees.”

To validate the research, a preliminary test was conducted to refine the original codebook for content analysis, selecting only the categories with significant results. This adjustment involved refining the initial sample, reducing it from 212 pieces to those that strictly met the selected parameters. The reliability of the analysis was ensured through a test–retest process (repeating the analysis at different times).

4. Results and Discussion

4.1. Quantitative Results of the Content Analysis

Out of the 78 media pieces analysed, the majority correspond to news (44) and opinion (15), whereas the sample only includes 8 interviews and 9 feature stories, as shown in Table 1.

Table 1. Type of information corresponding to the pieces.

Opinion piece	Chronicle	Interview	News	Feature
15	0	8	44	9

Quantitative analysis of the corpus ($N = 78$) reveals an asymmetrical distribution that reflects the diversity of news agendas in the Spanish media ecosystem regarding the climate–migration nexus. As shown in Table 2, the sample is led by the national press (85.9%), with *El País* contributing 37.2% of the total, followed by *ElDiario.es* with 34.6%. Meanwhile, the regional press represents only 14.1%.

Table 2. Number of pieces according to geographical scope and type of media.

National media				Regional media			Total
67 (85.9%)				11 (14.1%)			
<i>ABC</i>	<i>El Mundo</i>	<i>El País</i>	<i>ElDiario.es</i>	<i>Canarias 7</i>	<i>Diario Sur</i>	<i>La Voz de Almería</i>	
9 (11.5%)	2 (2.6%)	29 (37.2%)	27 (34.6%)	6 (7.7%)	5 (6.4%)	0	78

Regarding the geographical scope of the coverage, the results show a marked tendency towards the delocalisation of the phenomenon. The corpus is dominated by international articles ($n = 43$), which represent 55.1% of the sample, compared to national articles (26.9%) and regional articles (21.8%). This spatial asymmetry is not neutral; by projecting the narrative onto geographically remote settings (such as Senegal, India, or Tuvalu), the Spanish media activate what Chouliaraki and Georgiou (2022) define as a strategy of “distancing.” This externalisation mechanism allows the recipient to perceive climate mobility as an exogenous crisis, located in an uncontrollable “elsewhere,” which deactivates the urgency in the immediate context.

Regarding the authorship of the articles, as detailed in Table 3, news production falls mainly to in-house editors ($n = 24$) and external contributors ($n = 24$), who together account for 64% of the total corpus. This parity is highly significant: While editors ensure the continuity of the media outlet’s editorial line, the strong presence of contributors—often academics, climate experts, or activists—allows for the introduction of more complex theoretical frameworks and background information that challenge the immediacy of daily reporting. On the other hand, correspondents ($n = 12$) maintain a significant presence, providing coverage from points of origin or transit and adding a layer of ethnographic authenticity to the discourse.

Table 3. Authorship of the pieces studied.

News agency	Media contributor	Media editor	Correspondent	Anonymous	Total
10	24	24	12	5	78

The distribution of the pieces in the different sections of the newspapers reveals a notable narrative fragmentation and a lack of editorial consensus on the nature of the phenomenon. As detailed in Table 4, the most common location corresponds to the category of “local geographical point” ($n = 15$), such as Andalusia or the Canary Islands. This confirms that the climate–migration nexus is primarily perceived as a local or territorial event, depending on the proximity of the landing site or the meteorological impact. Significantly, the “culture and leisure” section ($n = 13$) ranks second in frequency, surpassing strategic sections such as “international” ($n = 6$). This placement, added to the category of “other” ($n = 11$), which includes Sunday supplements and opinion blogs, suggests a tendency to “supplement” the conflict. Instead of being integrated into the *hard news* agenda, climate migration is shifting towards spaces of relaxed consumption or aesthetic analysis, which contributes to the trivialisation detected in the qualitative analysis.

However, the existence of the “climate change” section, which recognises the phenomenon as a first-rate news category ($n = 11$), combined with a high rate of both in-house and collaborative authorship (64%), supports Boykoff’s thesis (2011) that specialisation in environmental journalism is an indispensable requirement for overcoming the “false balance” in news reporting. At the same time, it contributes to establishing a thematic silo, preventing cross-cutting coverage. As Nash (2019) and Sakellari (2021) point out, treating climate refuge as a science or environmental issue strips it of its human and legal urgency, presenting it as an isolated biophysical agent rather than reflecting the reconfiguration of asylum policies and global economic frameworks.

Table 4. Section where the pieces are located.

Section	Number of pieces	Section	Number of pieces
Culture and leisure	13	International	6
Climate change	11	Society	4
Politics	2	Events	1
Local geographical point	15	Other	11
Economy	2	Total	78

Analysis of the sources consulted by journalists reveals a clear institutional and technical citation structure that influences how the phenomenon is framed in terms of administrative management. As detailed in Figure 1, media discourse is built on two main pillars: government sources ($n = 19$) and academic or technical experts ($n = 27$). This hegemony of “official voices” suggests that climate migration is narrated from the centres of power and knowledge of the Global North, prioritising the state’s vision and expert analysis over the lived experience of migrants.

Less frequently used sources include international organisations ($n = 15$) and the third sector ($n = 11$), which operate as mediators of the conflict. However, it is critical to note the marginality of the United Nations ($n = 3$), despite being the body that leads the legal frameworks for protection, and, especially, the scarce presence of victims or migrants ($n = 9$). This underrepresentation of the protagonists of displacement

themselves highlights a process of narrative dehumanisation, where migrants are the object of discourse but rarely the subject of enunciation—an observation shared by authors such as Bevitori and Johnson (2022) and Bonneux and Van Praag (2024). Only 14 articles out of 78 mentioned migrants as people with agency or used their statements. Finally, the minimal mention of the security forces ($n = 1$) suggests that the climate–migration nexus has moved beyond purely police-related events in the 2025 corpus, instead becoming part of institutional and technical debates.

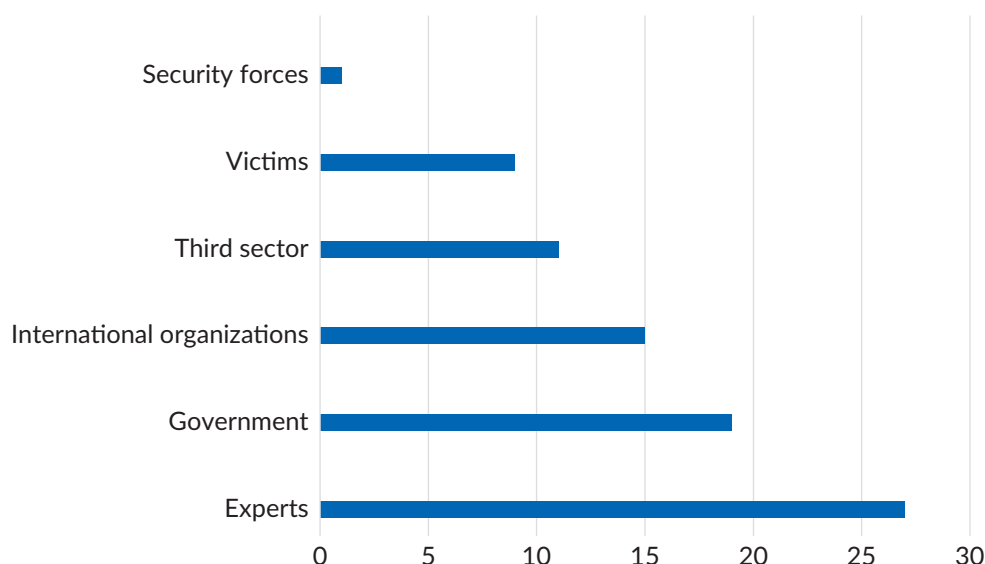


Figure 1. Sources cited in the articles.

As Entman (1993) points out, framing involves defining problems and suggesting solutions. However, as Table 5 shows, the media only fulfil the first function (defining the disaster), with the “impact” frame ($n = 40$) dominating and appearing three times more frequently than pieces focused on the “causes” ($n = 13$) or possible “solutions” ($n = 13$). Thematically, “politics” ($n = 27$) and “human rights” ($n = 21$) frames stand out. This volume contrasts with the low frequency of the “judicial and legislative” frame ($n = 8$). This gap indicates that, although the issue is politicised and appeals to human rights ethics, the discourse does not result in proposals for legal reform or real legal protection status, remaining at the stage of rhetorical denunciation. Finally, the prominence of the “culture, art, and literature” frame ($n = 23$) and its recurring placement in “culture and leisure” sections ($n = 13$) is not a spontaneous phenomenon but rather responds to a high-profile media event—the 39th edition of the Goya Awards, which featured the film *Black Butterflies*, focused on the lives of women climate refugees.

Table 5. Frames used in news items.

Causes of the phenomenon	13	Economy	11
Impact of the phenomenon	40	Politics	27
Solutions to the phenomenon	13	Event	17
Scientific	11	History	2
Culture, art, and literature	23	Judicial and legislative	8
Human rights	21	Security	6

Analysis of the most frequently mentioned specific contexts in the articles reveals a narrative focused on the humanitarian consequences, but strikingly evasive about the industrial causes. As shown in Table 6, the predominant context is that of “risks for migrants” ($n = 16$), which reinforces the perception of the displaced person as a vulnerable subject exposed to physical dangers, shipwrecks, or homelessness. This approach is complemented by the presence of “science” ($n = 12$) and “health” ($n = 9$), placing the phenomenon in a framework of “climate pathology” and academic rigour.

However, the limited weight given to the sectors driving climate change is revealing. The “oil industry” ($n = 4$) and “energy” ($n = 4$) are barely present, which supports the idea of “structural censorship” or “obscurantism” mentioned by experts such as Vaillant in an interview with *eIDiario.es* (Actis, 2025). Similarly, “agriculture” ($n = 3$), which is the primary sector most affected by water stress and the main driver of displacement in the Southern frontier and the Sahel, is virtually invisible. Finally, the mention of “institutional corruption or dishonesty” ($n = 4$) suggests an emerging critical discourse on the management of climate or border funds, although this remains peripheral to the global agenda.

Table 6. Contexts associated with climate migration.

Context	Number of pieces	Context	Number of pieces
Agriculture	3	Oil industry	4
Science	12	Risks for migrants	16
Corruption or institutional dishonesty	4	Health	9
Education	7	Tourism	2
Energy	4	Total	61 frames (in 78 texts)

Finally, the results show a clear preference for terms with high emotional impact over technical categories in terms of conceptual rigour. The concept of “climate refugees” ($n = 29$) significantly predominates over those of “climate migrants” ($n = 9$) and “climate displaced persons” ($n = 8$). This choice of terminology suggests that the media opt for the framework of “international protection” and “refuge” to give the news greater gravity, even though this status is not formally recognised in the Geneva Convention. The most common approach involves articles that simply establish a general link between migration and climate without using specific labels ($n = 34$). This data indicates that, although the Spanish press has internalised the causal link between the two phenomena, it still lacks a consolidated terminological culture, preferring peripheral descriptions or euphemisms rather than anchoring itself in defined concepts. Finally, the “relationship between trafficking and climate migration” ($n = 5$) is confirmed as the weakest link in the information chain, with a marginal presence that obscures the risks of criminal exploitation associated with environmentally forced mobility.

4.2. Integration of CDA Results and Discussion

The combined interpretation of content analysis and CDA results reveals a deep fracture in the representation of the climate–migration nexus in Spain. The information system not only operates as a disseminator of data but also as an ontological hierarchy device that determines which displacements are worthy of protection and which are stripped of their political status through diverse discursive strategies.

On certain occasions, the concept of “climate refugee” is trivialised, particularly in the conservative press. In articles relating to major cultural events, such as *ABC*’s coverage of the Goya Awards, climate migration is

portrayed as just one of many issues, with an ironic and mocking tone (Argudo, 2025; Muñoz, 2025). This disaffection reaches its peak with what could be termed “semantic gentrification”—the expression “climate refugee” is now used to describe tourists fleeing the summer heat, as evidenced by articles analysed from *El Mundo* (Alemany, 2025; Herguedas, 2025). This shift in meaning blurs the framework of structural vulnerability, transforming a humanitarian tragedy into an anecdote of bourgeois consumption.

In one of the pieces of *El Mundo*, the journalist uses the concept of climate refugees in a flippant and ironic way, unrelated to the context of climate change. This kind of “light” use of the term may contribute to numbing the sense of urgency surrounding a crisis that is already affecting millions of people today. Furthermore, in phrases such as “the highly uncertain future of all climate refugees roaming the planet” (Espada, 2025), the use of the verb “roaming,” which is often associated with moving freely from place to place or even with a lack of control, strips the displaced person of their status as a victim of climate injustice. This reinforces the idea of an amorphous and wandering mass, which connects with the frameworks of “threat” or “chaos.”

The utilitarian view that classifies migrants as a “nomadic proletariat” persists, prioritising the narrative of “attraction” (economic benefit for Europe) over that of “expulsion” (climate responsibility), as evidenced in Pérez’s (2025) article in *El País* on December 7. In contrast, the discourse of the Global South, such as the one represented by the Colombian Ombudsman’s Office in an *El País* piece of 20 September (Marín, 2025), links climate to social justice and ethnic survival, demanding comprehensive legal frameworks and employing the standard of “human mobility due to climate crisis,” which overcomes the legal paralysis of the term “refugee.”

In contrast to the technical narrative, the article published in *ElDiario.es* on 9 August (Espejo, 2025) considers the physical dispossession caused by climate change, which leads to “nominalist degradation” within the host society. The author links Bauman’s (1998, as cited in Espejo, 2025) creation of “subclasses” with Schmitt’s (1922, as cited in Espejo, 2025) idea of sovereign power to “exclude and declare who is outside the law.” In this framework, the invisibility of the climate-protection nexus is not an informational oversight, but a functional element of a “bureaucratic ethic” and “obedience” that transforms the displaced into a threat or an internal enemy. Thus, with this media logic, any possibility of climate justice or “ethical hospitality” is nullified. The same newspaper notes that this dehumanisation can lead to physical violence, citing the example of bathers in Granada who knocked down and immobilised migrants who arrived on the beach.

Referring to the alert in the previous article about “obedience” and “sub-humanity,” *ElDiario.es* on 8 August refers to the “toxic climate” of the media and political system, as well as the normalisation of xenophobic discourse that labels migrants as a “threat.” As a result, ordinary citizens feel justified in exercising violence that the publication defines as “social control outside the rule of law” (Clavell Segura, 2025a). Similar circumstances are mentioned in six texts labelled under the “security” frame. Conversely, political scientist Naïr, in an event covered by *Canarias Ahora* (2025), reveals an attempt to shift the media’s focus from the “invasion” narrative towards governance based on co-development and sustainability, using the statistical evidence that only 3% of African mobility is headed towards Europe. Morales (2025) from *ElDiario.es* points out that African migration from Africa to Spain accounts for less than 2% of the total, despite some people using terms such as “invasion.” The study found related humanitarian approaches under the labels of “human rights” ($n = 21$), “solutions” frameworks ($n = 13$), as well as in the context of the risks faced by migrants ($n = 16$).

Although “politics” is a recurring frame in the Spanish media ($n = 27$), it often lacks explanatory force. In reference to political communication, Naïr in *Canarias Ahora* (2025) emphasises that ignorance of the African reality is a structural failure of the media, which not only fails to correct this, but also perpetuates it by omitting the root causes. While the media often use the framework relating to the impact of the phenomenon ($n = 40$) and explain migration using scientific ($n = 11$), economic ($n = 11$), or related events ($n = 17$) perspectives, they still seem to fail to explain what this really means for people who become climate migrants. Naïr therefore proposes a deconstruction of the media’s vision to integrate climate change as a driver of sustainability and co-development, and not as an alien catastrophe. This transformation is essential for the Canary Islands to move from the narrative of a “border wall” to that of a laboratory of social solidarity. As stated in *EIDiario.es* piece from 25 December, the Tenerife Immigration Observatory (Morales, 2025) uses academic evidence to place the phenomenon within a global “climate alarm” and a historical trend of human expansion.

The article in *EIDiario.es* from 12 September highlights the “climate paradox” in Africa, given that “despite contributing less than 4% of global emissions and using only 6% of the world’s energy, it is the region most severely impacted by climate change” (Clavell Segura, 2025b). This argument challenges the notion of “blaming the migrant,” instead presenting a counter-narrative in which migration is viewed as a consequence of “the devastating effects of global warming” (Clavell Segura, 2025b). The text shifts the focus of migration away from the traditional approach of the press, viewing it as an issue of “charity” or “humanitarianism,” and towards the realm of reparation and international justice. This alludes to the idea that African countries have been advocating for years: There will be no climate justice without financial justice.

In Spanish newspapers, the outsourcing of articles to external contributors ($n = 24$) or even in-house production with the involvement of correspondents ($n = 12$), as well as the use of expert sources ($n = 27$), international organisations ($n = 15$), and third sector ($n = 11$), allows for the introduction of technical nuances into the daily news cycle. Examples found in the sample include the piece published by *EIDiario.es* on 10 July, written by experts who argue that climate migration is not universal, but rather a selective and stratified phenomenon which frequently leads to immobility or internal displacement (Boado Cebolla & Vergne, 2025). Using technical models, they challenge the idea of “pure climate cause,” cautioning that depoliticising what are often governance crises and using alarmist headlines about refugees can fuel denialism.

Along these lines, another article from *EIDiario.es*, dated 16 October, proposes the concept of “neither myth nor avalanche,” presenting the intention to migrate as a key variable (Pañeda & Meierrieks, 2025). Their study in Gambia and Senegal shows that migration aspirations increase in the face of irreversible climate effects. This challenges catastrophic narratives of a mass migration to the North and highlights the need for accounts that recognise the multiple causes and diversity of contexts.

The Spanish media’s silence regarding the industries responsible for global warming, such as the oil industry ($n = 4$), is almost total. In the interview with Vaillant, published in *EIDiario.es* on 14 January (Actis, 2025), soon those displaced by fires in Los Angeles sheds light on structural censorship imposed by media ownership and the hegemony of fossil capital. Vaillant highlights how corporate pressures from the oil industry prevent the link between human mobility and energy dependence from being recognized. This coercion explains why the hegemonic narrative prefers to frame migration as a “humanitarian drama” or a “public order” issue, sidestepping its origin in the collapse of civilisation resulting from the fossil fuel model.

The link between climate and trafficking, present only in 5 pieces, emerges tangentially in ABC, alerting that the lack of foresight in the face of mass displacement strengthens criminal networks (Sánchez, 2025). This vulnerability is exacerbated in contexts of statelessness, such as the Rohingya crisis referred to in a special analysis of *El País* published on 24 August, where environmental collapse acts as a catalyst for transnational crime and child exploitation (Aunión, 2025). The invisibility of this link in the agendas of the Global North may give rise to interpretations suggesting that governance is shifted towards armed groups, and an underfunded humanitarian system withdraws. Even in the regional press, in articles analysed from *Canarias7*, specialised discourse is absorbed by the crisis management framework, prioritising logistics and resource distribution narratives over climate causes and trafficking risks. Information saturation in border territories obscures structural vulnerability, confirming that proximity to a phenomenon does not necessarily lead to a more in-depth analysis.

Finally, discursive homogenisation is linked to the ownership structure. The duplication of content between *Diario Sur* and *Canarias7* is evidence of centralized production by the Vocento Group, which favours generic and security-oriented frameworks. This dynamic oversimplifies the phenomenon, displacing localised coverage and subordinating the territorial reality to centralised editorial guidelines.

5. Conclusions

The research shows that the media treatment of the climate–migration nexus in the Spanish press in 2025 is based on a structural paradox: While the phenomenon is becoming quantitatively relevant, its representation suffers from profound narrative fragmentation and an elision of responsibilities.

The hegemony of international coverage (55.1%) over national and regional coverage reveals a strategy of delocalising the issue. By projecting climate refuge onto geographically remote scenarios (such as Tuvalu or the Sahel), the media often activate a mechanism of “distancing” (Chouliaraki & Georgiou, 2022). This exogenous projection deactivates the political urgency on the Southern border, transforming an immediate structural challenge into a distant humanitarian spectacle. Despite the focus on “climate change” sections, a tendency to shift the debate towards more light-hearted or aesthetic contexts (“culture and leisure”) remains; whilst this may bring the issue to a wider audience, it can also lead to trivialisation if approached through the lens of science fiction, utopia, or humour. The texts show a systematic evasion of corporate responsibilities; mention of the sectors driving global warming (oil and energy) is minimal ($n = 8$), obscuring the “climate paradox” whereby regions with lower emissions suffer the most severe impacts. The link between the environmental crisis and human trafficking networks is the weakest link in the agenda ($n = 5$), which leaves the most vulnerable groups unprotected and limits migration governance to a purely logistical or security-based approach. In short, results suggest that the Spanish press might operate under a “bureaucratic ethic” that treats the climate as an isolated biophysical agent, sidestepping a profound debate on historical reparations, financial justice, and the reform of international protection frameworks.

By reviving concepts such as “historical reparation” and “humanism,” academia and media have the potential to dismantle the “bureaucratic ethic” that seems to dominate border management, proposing a narrative in which mobility is not a disruption but an inherent response to a planet undergoing ecological and social transformation. Nevertheless, this kind of approach is seldom found in the press.

Our research has several limitations. For example, it has a non-generalizability limitation of rather small-N studies. Amplifying the sample by including other national newspapers and regional press from non-border regions would enrich the results and show if the patterns found hold on a larger scale. Though the methodology was appropriate to address the research objectives, the inter-rater reliability of results could have been improved if several analysts were employed, avoiding the interpretative bias of a two-person team. Also, the results call for future research in terms of a deeper understanding of the underlying meanings and implications of media narratives. Despite these limitations, the findings of this research have normative implications for public policy design. Narrative fragmentation suggests that the public receives incomplete information, hindering the construction of a social consensus for the creation of specific legal frameworks. It is imperative that the Spanish political agenda shift from managing the “emergency” to preventive legislation, leading the way in proposing climate visas or temporary protection mechanisms that recognize environmental degradation as a legitimate driver of forced displacement.

The current discourse, by depoliticizing the problem and presenting it as a biophysical phenomenon, often misses the opportunity to push for reform in global governance. Therefore, migration governance policies should address “climate justice” not merely as a theoretical concept, but as an integral part of development aid and global migration pacts.

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Conflict of Interests

The authors declare no conflict of interests.

LLMs Disclosure

DeepL has been used to assist with part of the translation.

Supplementary Material

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

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Inclusive Communication Observatories: A Model for Participatory Evaluation and Age-Friendly Governance

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Abstract

The twin green and digital transition is reshaping municipal governance through increasingly complex communication environments that mediate access to public services, policy interpretation, and citizen participation. The existing research on digital governance, age-friendly cities, accessibility, and participatory governance has made significant advances in understanding the challenges older adults face in digitized institutional contexts. However, municipal communication remains insufficiently conceptualized as an object of participatory evaluation. This article develops a theoretical framework, grounded in a critical review, to examine communicative exclusion as a specific form of institutional inequality that affects older adults in contexts of accelerated socio-technical transformation. The analysis argues that communication exclusion cannot be reduced to individual deficits in digital skills; rather, it must also be understood in relation to how municipalities design and organize their communication systems, information architectures, and digital infrastructures. Drawing on the literature on citizen observatories and participatory governance, this article sets forth the model of inclusive communication observatories as a participatory evaluation infrastructure through which older adults can contribute to the co-definition, auditing, interpretation, and institutional review of municipal communication processes. The work shifts communication from a secondary administrative function to a procedural requirement that determines the intelligibility and accessibility of, and participation in, public policies. The article conceptualizes inclusive communication observatories as an infrastructure for shared governance and participatory evaluation. This contribution expands the conversation on procedural justice, digital ageism, age-friendly governance, and democratic inclusion within the context of the twin green and digital transition.

Keywords

age-friendly governance; citizen observatories; communication exclusion; municipal communication; participatory governance; twin green and digital transition

1. Introduction

The twin green and digital transition entails the interdependent transformation of municipalities as territories to create more sustainable, inclusive, and resilient cities and communities, as outlined in SDG 11 of the 2030 Agenda (UN, 2015) and the Plan for the Decade of Healthy Aging 2020–2030 (WHO, 2020). From this perspective, in building inclusive cities based on urban development that prioritizes equity and social justice, digitalization can serve as a tool to enhance urban planning, optimize resources, reduce environmental impacts, and strengthen the resilience of communities. However, this digitalization will only be consistent with a sustainable city if it is designed with accessibility, equality, and social inclusion in mind. The expansion of digital infrastructure has created fragmented information environments and increased cognitive demands, leading to information overload and user disorientation (Bawden & Robinson, 2009). Similar dynamics are also observed in environmental policy contexts, where, despite the incorporation of digitalization, data's increasing complexity makes it difficult to translate it into actionable knowledge for urban sustainability (Grainger et al., 2021).

By digitizing access to public services, local governments promote sustainable behavioral changes, deploy smart infrastructure, and develop structured public policy agendas in areas such as mobility, energy efficiency, health, and social services, among others (Dedović & Cromptvoets, 2026; European Commission, 2021). This issue is often analyzed in terms of technological innovation, administrative capacity, or policy effectiveness. However, little attention has been paid to the resulting communication processes, which are especially relevant considering that the effectiveness of public management hinges on citizens' ability to navigate complex policy environments mediated by digital and integrated communication systems (Bannister & Connolly, 2012). Furthermore, this situation is also reflected in discussions about the environmental transition within citizen observatories, which, through data collection and systematization, help identify the socio-technical implications of the digital infrastructures involved in these processes, as well as in the design and implementation of policies (Erbaugh et al., 2024).

Previous research in European contexts shows that older people are frequently identified as technologically deficient or vulnerable users, which significantly shapes the implementation of public policies and their communication (Kolotouchkina et al., 2023; Llorente-Barroso et al., 2023; Ménard et al., 2025). This reality has direct implications for the design of communication infrastructures, service delivery procedures, and expectations regarding digital literacy (Xu & Larsson, 2021), as the ability to access public services and complete digital administrative procedures requires users with profiles characterized by consistent connectivity, familiarity with administrative processes, and a high degree of individual initiative.

As a result, when local institutions overlook diverse aging experiences shaped by accumulated inequalities, ageism emerges in public communication regarding services and administrative procedures. In municipal communication systems and on e-government platforms, citizens may struggle to find relevant information, understand procedures and complete essential tasks (Molina Rodríguez-Navas et al., 2021; Nouri et al.,

2020; Seifert, 2020). These challenges became particularly evident during the Covid-19 pandemic, when digitalization emerged as a top priority and exposed significant gaps between the designs of administrative structures and users' digital skills.

At the local level, access to public administration is facilitated by digital infrastructures, integrated communication environments (offline and online), and complex information systems (Campillo-Alhama & Martínez-Sala, 2017). When unclear language, fragmented structures, or unrealistic overestimations of users' capabilities are employed, forms of exclusion arise that extend beyond the content of communication infrastructures and the possibilities for accessing them (Laenens et al., 2018). Citizens may formally have digital access, yet still face significant barriers and difficulties identifying relevant information, interpreting procedures, or participating effectively in public processes. This reality is identified in this study under the concept of communicative exclusion, understood as the systematic disadvantage associated with accessibility, intelligibility, and usability in the structure, design, and organization of municipal communication. This disadvantage impacts citizens' ability to know, understand, interact, and engage in the effective development of local public policies.

With the twin green and digital transition, the issues highlighted take on particular relevance, as policies related to the ecological and digital transformation entail high levels of technical complexity, behavioral adaptation, and changes in the conditions for accessing public services. Their implementation hinges not only on physical and technological infrastructure, but also on citizens being informed and able to understand what is changing, why it matters, and how they can act accordingly. In this regard, research on community learning shows that citizen engagement depends not only on access to information, but also on its interpretability within specific social contexts (Groulx et al., 2021).

Older citizens are particularly affected by these dynamics, as reflected by WHO in the Age-Friendly Cities and Communities program, which builds on the Vancouver Protocol (WHO, 2007). Its goal is to encourage and support cities and communities worldwide in creating environments that promote healthy, sustainable, and active aging (WHO Regional Office for Europe, 2018). The program's development is based on eight areas of friendliness that help identify the needs and demands of older adults, enabling the creation of public policies on key issues that affect them as a group (Rodríguez-Rodríguez et al., 2024; van Hoof & Marston, 2021): (1) outdoor spaces and buildings, (2) transportation, (3) housing, (4) social participation, (5) respect and social inclusion, (6) civic participation, (7) communication and information, and (8) community support and health services.

Municipal communication and information, as a management area, is not seen as a mere administrative function, but rather as a cross-cutting tool that can help strengthen citizen engagement in civic participation processes (Kolotouchkina et al., 2023; Molina Rodríguez-Navas et al., 2021). Through the connection between communication and information, on the one hand, and civic participation, on the other, older people are no longer seen solely as recipients of public policies but as active participants in assessment, deliberation, and decision-making processes (Ansell & Torfing, 2021). This shared governance approach goes beyond traditional hierarchical models of local government by fostering horizontal cooperation and collective efforts to identify community needs, priorities, and solutions.

Inequalities in later life reflect cumulative trajectories linked to education, health, socioeconomic status, and prior exposure to institutions (Maj-Waśniowska & Jedynak, 2020). Therefore, communicative exclusion cannot be reduced to individual skills; rather, it must be understood in relation to how institutions design their communication infrastructures and identify users' digital skills and competencies. Likewise, older adults occupy a distinctive epistemic position: their situated experience allows them to identify barriers related to the accessibility and usability of digital communication infrastructures, which may be less apparent in technical evaluations. This provides relevant experiential knowledge for evaluating communication effectiveness (Krick, 2022).

In the literature reviewed, the communicative and informational dimension of local public action appears highly fragmented (Sánchez-González et al., 2020). This gap justifies the analytical shift undertaken in this study, which adopts a problematizing perspective (Alvesson & Sandberg, 2020) that allows for an analysis of the limitations in conceptualizing municipal communication as an object of evaluation. This article examines municipal communication as an object of participatory evaluation in the context of the twin green and digital transition. It addresses the following research question: How can municipal communication be conceptualized and evaluated as a participatory governance infrastructure capable of reducing communicative exclusion among older adults? To answer this question, the article develops a problematizing review across seven adjacent fields of research and proposes the inclusive communication observatory (ICO) model as a framework for the participatory evaluation of municipal communication. The contribution advances existing debates on age-friendly governance, participatory governance, procedural justice, and digital ageism by conceptualizing communication not as a secondary administrative function but as an evaluable governance infrastructure.

2. Methodological Approach: Problematizing Review and Theoretical Construction

The article presents a conceptual contribution as an alternative to an empirical study or a systematic review of existing literature. From a middle-range theory perspective (Merton, 2002), and in line with approaches focused on the analytical and cumulative construction of social knowledge (Hedström & Udehn, 2009), the study aims to build progressive and cumulative knowledge about a social phenomenon: the communicative exclusion of older people as a consequence of a transformative context of a twin green and digital transition based on sustainability and digitalization. Building this conceptual framework, based on a problematizing review (Alvesson & Sandberg, 2020), allows us to examine this phenomenon from an integrated analytical perspective.

Unlike integrative reviews, which synthesize and consolidate existing knowledge, problematizing reviews identify and critically examine the assumptions underlying established fields of research. Questioning these assumptions creates room for theoretical reorientation and conceptual development in public policy evaluation by connecting theoretical concepts with operational dimensions.

This approach is particularly suitable in contexts where relevant knowledge is scattered across adjacent but weakly connected fields, and where the absence of a shared analytical approach limits the cumulative development of knowledge. In this regard, middle-range conceptualizations allow for the articulation of analytical relationships between problems, mechanisms, and institutional processes, fostering the progressive development of theoretical frameworks that can be empirically refined and subsequently tested

(Hedström & Udehn, 2009; Whetten, 1989). Likewise, this type of approach is particularly relevant in fields marked by conceptual and methodological fragmentation, where analytical integration across knowledge domains is a necessary condition for moving toward more consistent and cumulative explanations.

The review follows a selective approach focused on a theoretical corpus, aiming to identify specific areas related to communicative exclusion. Rather than aiming for representativeness, priority is given to research that focuses on the seven main dimensions of the problem at hand.

Each of these seven approaches offers partial insights into how citizens communicate with public institutions. However, none of them systematically address an analysis of municipal communication as the subject of participatory evaluation, but rather as the dissemination of public policies (Bannister & Connolly, 2012). In all of them, communication is treated as a secondary dimension, which limits the capacity to explain how communication systems and processes can facilitate citizen engagement in collaborative participation processes (Zou et al., 2026).

Municipal communication remains insufficiently conceptualized as an integrated infrastructure subject to systematic evaluation. This limitation is not only empirical but also conceptual. And it reflects the lack of mechanisms through which communicative effectiveness can be defined, evaluated, and reviewed jointly by older adults and public and local institutions. To bridge this gap, we must move beyond viewing communication as an inherent part of municipal activity and instead conceptualize it as a subject for participatory evaluation. Recognizing this limitation allows us to move forward and propose infrastructures that structure municipal communication from an inclusive perspective. In the context of the twin green and digital transition, where citizen engagement increasingly hinges on accessible and understandable communication, this circumstance takes on significant relevance.

In this methodological process, the approaches identified in Table 1 are not treated as parallel contributions, but rather as a structured analysis centered around three problematizing questions implicit in municipal communication. This allows for a cross-sectional analysis of the seven approaches outlined: (a) How is municipal communication analyzed in debates on the twin green and digital transition and age-friendly governance? (b) To what extent do existing frameworks recognize citizens, particularly older adults, as evaluators of communicative effectiveness rather than merely passive recipients of information? (c) What conceptual shift is needed to expand the citizen observatory model to the realm of participatory observatories for auditing municipal communication?

Table 1. Addressing communicative exclusion through a problematizing review approach.

Analytical approaches	Priority contributions	Limitations of the approaches
(1) A twin green and digital transition in a public policy context where communication demands are intensifying	Bannister and Connolly (2012) Dedović and Cromptvoets (2026) Erbaugh et al. (2024) European Commission (2021)	Communication is primarily viewed as a functional tool for implementing digital and sustainable policies, rather than being analyzed as an institutional infrastructure that shapes citizens' access, understanding, and engagement

Table 1. (Cont.) Addressing communicative exclusion through a problematizing review approach.

Analytical approaches	Priority contributions	Limitations of the approaches
(2) Age-friendly cities that emphasize civic participation and highlight communication as an implicit condition, without presenting it as a cross-cutting evaluation criterion	Fitzgerald and Caro (2014) Kong et al. (2025) Llorente-Barroso et al. (2023) Maj-Waśniowska and Jedynak (2020) WHO (2007) Zou et al. (2026)	Limited focus on communication as a cross-cutting area subject to ongoing evaluation within local governance processes
(3) The digital divide or inequalities stemming from the individual capabilities of older adults versus the efficient design of institutional communication infrastructures	Bannister and Connolly (2012) Nouri et al. (2020) Olsson and Viscovi (2023) Seifert (2020) van Dijk (2020)	Limited ability to explain how institutional communication systems and processes themselves produce, reproduce, or amplify dynamics of communicative exclusion
(4) Digital ageism and communication barriers related to accessibility, usability, intelligibility, and navigation in institutional digital environments	Bawden and Robinson (2009) Chu et al. (2022) Kolotouchkina et al. (2023) Laenens et al. (2018) Levy and Macdonald (2016) Molina Rodríguez-Navas et al. (2021) Rosales et al. (2023)	Approaches that focus on the technical or functional correction of communication systems predominate, with little consideration given to the interpretive experiences of citizens in their evaluation
(5) Institutional ageism and the representation of older adults in communication and deliberative processes stemming from municipal action	Higgs and Gilleard (2020) Kolotouchkina et al. (2023) Ménard et al. (2025) Olsson and Viscovi (2023)	There is a lack of analytical and evaluative tools that connect institutional and representational biases to the effective transformation of municipal communication practices
(6) Participatory governance and citizen engagement in public policy processes	Emerson et al. (2012) Fung (2015) Krick (2022) Laenens et al. (2018) Nabatchi and Leighninger (2015)	There is a lack of structured mechanisms to evaluate municipal communication as a procedural requirement that enables collaborative participation
(7) Citizen observatories as a participatory infrastructure for the distributed production of knowledge in public policy	Liu et al. (2014) Soacha-Godoy et al. (2025) Wehn and Evers (2015) Wehn et al. (2026)	Limited transferability to symbolic, intangible, and procedural areas related to public communication and the evaluation of communication processes

This article does not aim to summarize existing knowledge about communication exclusion by local institutions; rather, it approaches the topic through the lens of participatory evaluation of municipal communication. By aligning with the most relevant theoretical contributions, a new, limited model is developed. This framework establishes the relationships between municipal communication in the context of a twin green and digital transition and age-friendliness, the conceptualization of its evaluation process derived from citizen observatories, and the design of a shared governance model that can be implemented in local contexts with varying social, digitalization, and sustainability conditions.

3. Municipal Communication in the Context of the Twin Green and Digital Transition

At the local level, the twin green and digital transition requires municipalities to coordinate socio-technical processes that shape policy design and access to public services. These processes not only involve deploying digital infrastructure and implementing sustainability policies but also require deep reflection on how the twin green and digital transition can create structural situations of ageism. Municipal institutions must address these to prevent communicative exclusion (Dedović & Cromptvoets, 2026; European Commission, 2021).

In this context, access to public services is increasingly mediated by digital infrastructures (websites and e-government portals), integrated communication systems (offline and online), and information environments that are procedurally dense (Campillo-Alhama & Martínez-Sala, 2017). Administrative demands not only require citizens to interpret a variety of administrative requirements, but also to respond to the implementation of digitization-based communication policies that contribute to environmental sustainability and condition access to information, benefits, and the management of administrative procedures.

Empirical research on e-government highlights these limitations, revealing that managing public services and digital procedures often requires a high level of administrative literacy and procedural familiarity, which gives rise to significant barriers for older adults in processes such as applying for financial benefits, handling healthcare procedures (Nouri et al., 2020; Seifert, 2020; van Dijk, 2020), and managing social services (Olsson & Viscovi, 2023). Evidence from municipal communication also indicates that fragmented information architectures within complex communication infrastructures make it difficult to access services and procedures, especially for older adults who need coherent and well-structured environments (Molina Rodríguez-Navas et al., 2021). On a broader scale, the increase in information density in content aimed at older adults carries a significant risk of cognitive overload and a reduced ability to process and act on relevant information (Bawden & Robinson, 2009). When digital infrastructures are difficult to access, understand, and use, they can also limit older citizens' involvement and participation in shaping public policy (Bannister & Connolly, 2012).

All these patterns point to a form of communicative exclusion that cannot be reduced solely to users' low skill levels from a strict digital divide perspective. After analyzing the literature, a clear shift is identified from a focus on individual capabilities to the efficient configuration of communication infrastructures, along with the necessary involvement of institutions to facilitate civic participation (Laenens et al., 2018).

Communicative exclusion, a direct consequence of the deficiencies inherent in municipal communication systems and processes, is addressed through two interrelated dimensions: digital ageism and institutional ageism (Kolotouchkina et al., 2023).

The first dimension pertains to digital ageism, defined as the lack of cognitive and linguistic accessibility in communication from public institutions. These institutions often use bureaucratic terminology, unintelligible formats, and poorly structured environments that fall short of accessibility standards and clear language (Silva & Carvalho Pazin Vitoriano, 2021). This dimension significantly hampers the ability to translate formal access to information into effective understanding of the content, which requires considerable interpretive effort (Levy & Macdonald, 2016). In this context, older adults are identified as marginal or disadvantaged users (Ménard et al., 2025).

Digital ageism manifests itself through four fundamental aspects: cognitive accessibility, digital waste, communicative noise, and the targeting of topics for older people. Cognitive accessibility is a fundamental requirement for digital infrastructures. It involves making content easier to understand through clear language, a hierarchical organization of information, and predictable navigation—key aspects for digital autonomy and effective access to public services. Digital waste refers to repetitive content, outdated documentation, broken links, and overly complex structures that increase cognitive effort and impede users from quickly finding relevant information (Czaja et al., 2006; Sayago et al., 2011). Communication noise arises from fragmented information across various institutional systems or channels, as well as inconsistent terminology and structure (Bawden & Robinson, 2009). Finally, tailoring content to older adults necessitates establishing, within the municipal communication architecture, the visibility of content related to the design of public policies and specific programs derived from them. This is based on the fundamental premise that inclusion does not depend solely on technical accessibility criteria or the absence of digital and communication noise, but also on institutional decisions regarding communication priorities that ensure the needs and expectations of older adults are met as a diverse and plural age group (Phillipson & Buffel, 2020; Torku et al., 2021; WHO, 2007).

The second dimension pertains to institutional ageism, which is evident in both organizational routines and municipal communication practices. While communication on social policies promotes active aging, it addresses the topic symbolically and fails to consider the existing structural barriers to accessing information that shape participation processes. Older people are often treated as a homogeneous group of dependent individuals, which leads to significant dysfunctions in their participatory representation in policy design as legitimate stakeholders in local governance (Xu & Larsson, 2021).

Traditional models of citizen participation in local public processes have typically been structured around formalized entities (such as the Older Adults Council, sectoral councils, and neighborhood committees) that can, in some cases, exclude certain vulnerable population groups who lack access. Consultation mechanisms such as surveys, public hearings, or deliberative forums primarily focus on gathering citizens' preferences regarding the content of public policies, without examining the communicative conditions of access that make them operational (Fung, 2015; Nabatchi & Leighninger, 2015; Quick & Feldman, 2011). As a result, municipal communication remains an intrinsic condition of the participation processes themselves, rather than an object of evaluation in its own right. This limitation, which affects the evaluation of communication, is particularly relevant in contexts where engagement depends not only on formal opportunities but also on citizens' ability to interpret information about sectoral public policies in unstructured communication environments (Bannister & Connolly, 2012).

Through municipal communication, citizens interpret policies, assess their relevance, and engage with institutions. In contexts of rapid transformation, the ability to understand shifting rules and identify meaningful courses of action becomes a prerequisite for equitable participation. This is because difficulties in understanding lead to reduced involvement and limited capacity for action. In this regard, social inclusion in later stages of life depends not only on access to technologies, but also on how communication systems are designed and experienced in everyday contexts (Llorente-Barroso et al., 2023; Ménard et al., 2025).

Addressing communication exclusion as an institutional phenomenon within the context of the twin green and digital transition, therefore, requires a shift in analytical perspective. The central question is not just how

older citizens adapt to digitized environments that contribute to environmental sustainability, but also how municipalities can become much more sustainable from a social perspective by designing integrated communication systems and processes (both offline and online) that facilitate civic participation by older adults as a diverse and pluralistic group.

4. From Citizen Observatories to ICOs

From an analytical standpoint, citizen observatories are identified as participatory infrastructures that enable forms of observation in contexts where problems cannot be fully grasped through conventional administrative procedures, while also facilitating interaction between experiential, expert, and institutional knowledge. Research on citizen science and open data also shows that these infrastructures are not neutral; rather, they are shaped by power dynamics that influence who defines, controls, and benefits from the production of knowledge (Cooper et al., 2021).

In the institutional context, they emerge to address issues marked by high complexity and a limited capacity to observe or interpret constantly evolving policy environments. They enable citizens to contribute to the production, interpretation, and dissemination of knowledge relevant to public policy (Liu et al., 2014; Wehn & Evers, 2015), serving as participatory infrastructures that connect knowledge production with decision-making processes (Soacha-Godoy et al., 2025).

These observatories have primarily been applied to material, spatial, or environmental phenomena such as urban sustainability and environmental risk management. However, they are less focused on areas that are less directly observable, more interpretative in nature, and closely linked to how citizens access and interpret public action to understand how policy development affects them as a group (Habibi et al., 2025). In this regard, municipal communication represents a specific analytical subject that can be addressed within the framework of these participatory infrastructures. As an object of analysis, communication exhibits characteristics that justify the applicability of mechanisms based on traditional citizen observatories. These include the existence of distributed knowledge, marked asymmetries between institutional and citizen perspectives, and the need for the ongoing evaluation of communication systems and processes aimed at older adults.

From this perspective, ICOs are designed based on citizen observatories as a structural equivalent, not an analogy, to address underlying issues related to municipal communication and the resulting consequences for older adults in the context of the twin green and digital transition.

This has two key implications: first, communication aimed at older adults is repositioned as an intangible, observable, and measurable object; second, this group transitions from being solely a data provider to becoming an analyst and evaluator. This repositioning is particularly relevant, as the life experiences of older adults can reveal mismatches between institutional proposals and their actual experiences as users of digitized benefits and services. This contribution of knowledge is necessary to complement, in an integrated manner, the strict technical evaluations conducted by local institutions (Krick, 2022; Schade et al., 2021).

Table 2 operationalizes the comparison between the two infrastructures by specifying how the logic of citizen observatories is reconfigured when applied to municipal communication as an object of study. This highlights substantial differences not only in the object of analysis, but also in the knowledge produced and its resulting implications.

Table 2. Analytical comparison of citizen observatories and ICOs.

Analytical Dimension	Citizen observatories	ICOs
Typical policy areas	Environment, urban sustainability, health, mobility, risk management, and service monitoring	Municipal public communication, age-friendly governance, digital service communication, twin green and digital transition policies
Primary object of observation	Material, environmental, spatial, behavioral, or service-related phenomena	Communicative systems, information environments, clarity, accessibility, navigability, and representational fairness
The core governance problem addressed	Information deficits, weak monitoring capacity, and limited citizen-generated evidence	Communicative exclusion, low policy intelligibility, and weak citizen influence over communication design
Main type of knowledge generated	Citizen-generated data, local observations, and distributed evidence	Participatory evidence on barriers to understanding, access, usability, and symbolic inclusion
Typical citizen role	Citizen scientist, monitor, reporter, contributor, and co-interpreter	Citizen expert, co-evaluator, co-designer, and deliberative participant
Institutional function	Supplement monitoring systems, improve accountability, and support evidence-informed policy	Improve communicative quality, strengthen procedural fairness, and enhance inclusive participation
Temporal logic	Often project-based or issue-specific, sometimes ongoing	Intended as a cyclical and embedded evaluative mechanism within municipal governance
Main sources of legitimacy	Data relevance, transparency, and participatory monitoring	Fairness of communication processes, responsiveness, and citizen-recognized communicative standards
Evidence base	Multiple empirical applications across policy sectors	Model that requires future empirical validation
Main implementation risk	Limited institutional uptake after the pilot phase	Symbolic adoption without substantive organizational change

Note: Prepared by the authors based on Habibi et al. (2025), Liu et al. (2014), Montargil and Santos (2017), and Wehn et al. (2026).

As Table 2 shows, the transition from citizen observatories to ICOs involves much more than simply extending participatory practices to a new area. Rather, it entails a reinterpretation of the observatory's logic in relation to an object that is less directly observable, more interpretative, and structurally integrated into the conditions that shape access to and involvement in public policies through communication. In this way, municipal communication is identified as something that citizens can evaluate based on its effectiveness and sustainability.

ICOs are conceived as institutional infrastructures through which communication conditions can be systematically examined via participatory processes. This expansion is based on the recognition that municipal communication can benefit from structured forms of collective evaluation that combine direct experiential and institutional knowledge (Liu et al., 2014; Soacha-Godoy et al., 2025).

This proposal is not intended to replace existing, established approaches, but rather to reconnect their contributions around a new object of study: the participatory diagnosis and evaluation of municipal communication. This approach is grounded in the recognition that communication systems and processes involve distributed knowledge, interpretative uncertainty, and asymmetries between institutional and citizen perspectives. These circumstances can be addressed through structured forms of collective evaluation (Liu et al., 2014; Soacha-Godoy et al., 2025; Wehn & Evers, 2015), as proposed in this study through the design of ICOs as a model of shared governance.

The shift in the analytical procedure of ICOs compared to citizen observatories is summarized in Figure 1, which depicts a dual movement across two dimensions: on the one hand, the object of evaluation shifts from a material and technical object of observation, in the case of citizen observatories, to a symbolic, intangible, and procedural object, in the case of ICOs; on the other, the role of citizens in evaluation processes shifts from a focus on co-production for the collection and production of material data, exclusively in the case of citizen observatories, to much more complex, comprehensive, and plural processes based on the co-production of analysis criteria that enable, in a second stage, evaluative co-production between municipal technicians and representatives of the elderly as a group.

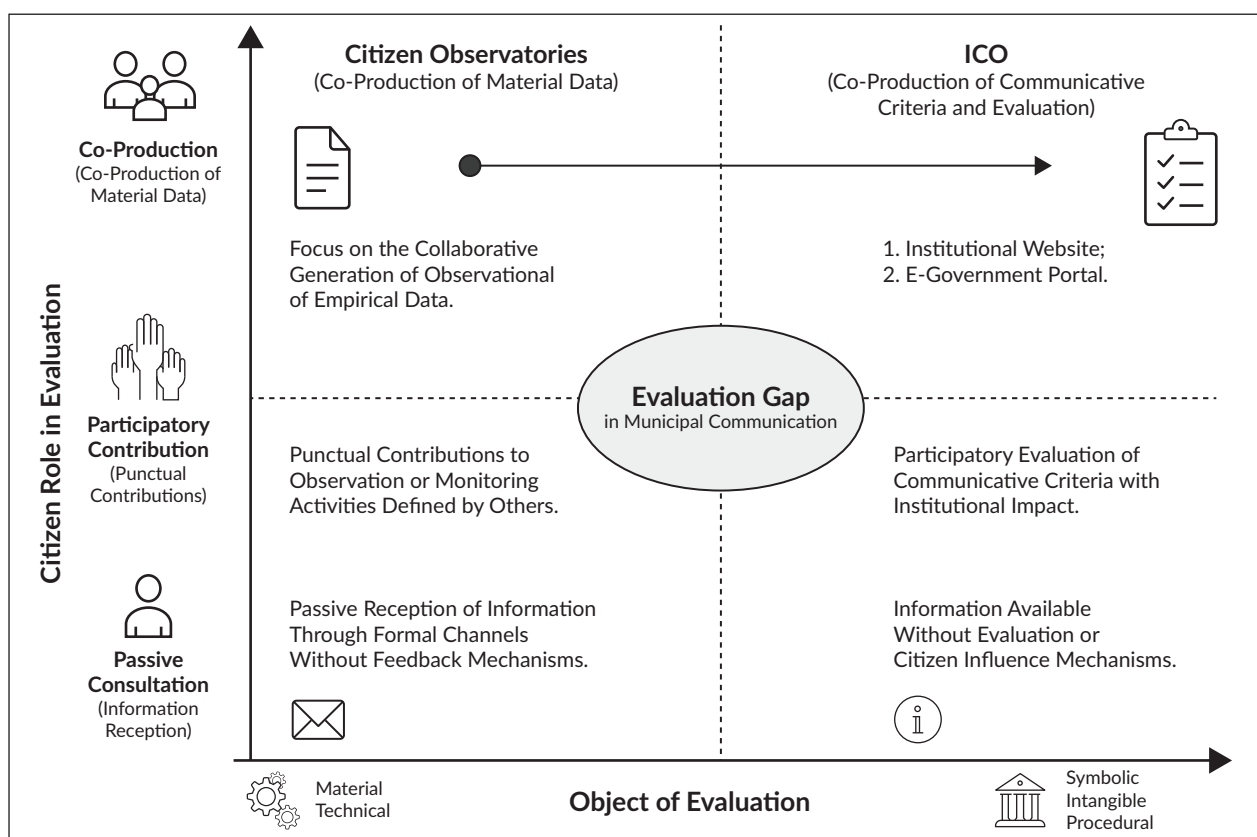


Figure 1. Conceptual extension and analytical displacement from citizen observatories to ICOs.

Based on these two dimensions, a gap is identified: the absence of standardized mechanisms for systematically evaluating communication systems and processes through civic participation at the municipal level. In the case of ICOs, observation processes are redefined for the participatory evaluation of communication aimed at older

adults. This involves assessing variables such as clear language, accessibility, usability, and content relevance, among others.

5. The ICO Model as a Sustainable Infrastructure for Shared Governance

Building on the analytical reinterpretation outlined in the previous section, a theoretical framework is presented that formalizes participatory evaluation within a shared governance process. The ICO is a general model based on civic participation. Its purpose is to combat the communicative exclusion of older people by helping to avert ageism (both digital and institutional). Involving citizens as evaluators helps identify barriers and shortcomings that can remain somewhat hidden in strictly institutional or technical assessments, particularly in settings where administrative communication is highly fragmented and information overload is common (Bannister & Connolly, 2012; Bawden & Robinson, 2009).

Figure 2 depicts a recursive process for the participatory evaluation of municipal communication. Its logic should not be interpreted as a linear technical sequence, but rather as a governance infrastructure aimed at transforming the communicative conditions that mediate the relationship between citizens and local institutions. The ICO model is based on a central premise: communicative exclusion stems not only from individual digital skills deficits, but also from how governments design, organize, and structure their public communication systems (Bannister & Connolly, 2012; Laenens et al., 2018). From this perspective, municipal communication is a procedural condition for participation, not a secondary administrative function (Emerson et al., 2012).

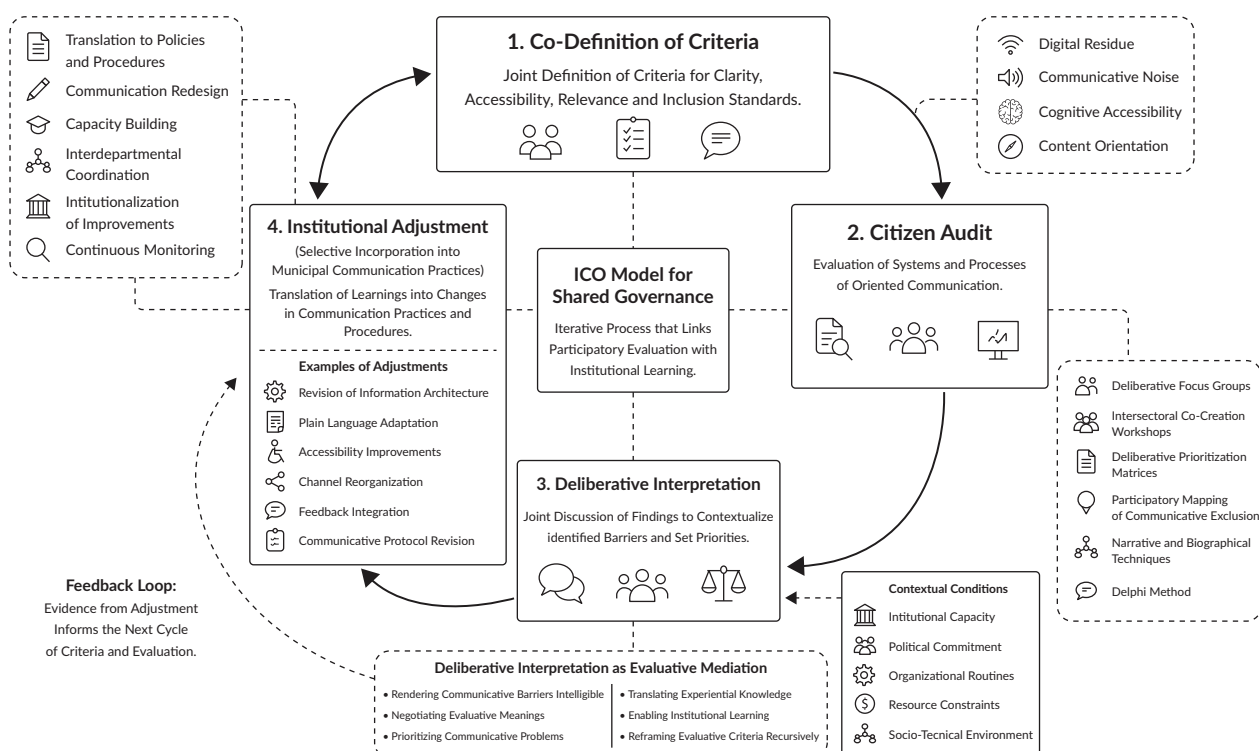


Figure 2. ICO model.

The process begins with the co-definition of criteria. This first phase forms the normative and epistemological core of the model, as it shifts the definition of communication quality from purely technical approaches to processes of shared construction between citizens and local institutions. Clarity, cognitive accessibility, information relevance, and inclusion are no longer attributes defined unilaterally by administrative departments or communication specialists. Instead, they are negotiated based on the situated experience of users, especially older adults. The goal is not just to create technical standards, but to develop evaluation criteria that are socially understandable and tied to the actual conditions under which municipal communication is used. This approach aligns with recent co-creation and participatory governance frameworks that underscore the need to integrate experiential and institutional knowledge into public evaluation processes (Fung, 2015).

This initial phase also brings together some of the structural issues identified in the literature and depicted in the upper right of the figure: digital waste, communication noise, cognitive accessibility barriers, and content orientation. These elements serve as problematic indicators that guide the definition of the evaluation criteria. The model is based on the idea that many municipal systems accumulate outdated information, have fragmented channels, redundancies, cognitive overload, or navigation architectures that are difficult to understand, which makes it challenging for citizens to identify relevant information and act on it (Bawden & Robinson, 2009; Molina Rodríguez-Navas et al., 2021). The literature on accessibility and plain language has clearly shown that the intelligibility of public information depends not only on the availability of content, but also on how it is structured, contextualized, and translated for different citizen profiles (Silva & Carvalho Pazin Vitoriano, 2021).

Based on the jointly defined criteria, the process moves forward toward a citizen audit. This second phase transforms the communicative evaluation into a systematic practice of observing and analyzing municipal communication systems. Citizens transition from passive recipients of messages to actively evaluating websites, administrative procedures, digital platforms, documents, navigation paths, and service channels. The audit goes beyond simply verifying formal compliance with technical standards; rather, it examines how communication actually functions in real-world contexts of institutional interaction. In this regard, the ICO model aligns with the logic of citizen observatories, which are participatory infrastructures for generating and evaluating distributed knowledge in complex governance contexts (Liu et al., 2014; Wehn & Evers, 2015).

The citizen audit also incorporates specific deliberative and participatory methodologies: deliberative focus groups, cross-sectoral co-creation workshops, deliberative prioritization matrices, participatory mapping of communication exclusion, narrative and biographical techniques, and Delphi methods. These tools make it possible to capture experiential dimensions that typically remain unseen in conventional technical evaluations. As a result, the evaluation shifts its focus away from solely instrumental variables and begins to consider how individuals interpret, navigate, and experience communication barriers in their day-to-day interactions with public administrations. This dimension is particularly relevant for older adults, whose life journeys and experiences with institutions help reveal gaps between the organizational assumptions of digital systems and their actual conditions of use (Krick, 2022).

The audit results do not automatically lead to institutional changes. Therefore, the model includes a third phase of deliberative interpretation, which serves as an evaluative mediation mechanism between citizen

evidence and institutional learning. At this stage, the findings are discussed collectively to contextualize identified barriers, negotiate evaluative meanings, and establish priorities for action. Deliberation plays a key role because it avoids two common reductionist approaches: on the one hand, interpreting communication problems solely as technical failures; on the other, treating them as purely subjective experiences with no potential for institutional translation. From the perspective of deliberative governance, communication is not merely a channel for transmitting information but a space for the shared construction of meaning and institutional legitimacy (Erbaugh et al., 2024).

Deliberative interpretation makes communication barriers intelligible, translates experiential knowledge into organizational knowledge, and facilitates institutional learning processes. The model assumes that municipal communication is a complex relational and cognitive infrastructure, shaped by administrative routines, organizational constraints, and institutional cultures. Therefore, communication issues require shared interpretation processes that connect citizen experiences with administrative and organizational logics. This deliberative component is particularly relevant in contexts of digital and environmental transition, which are characterized by high levels of technical complexity and social uncertainty.

The fourth phase involves institutional adjustment. Here, the knowledge generated through participatory evaluation is selectively integrated into municipal practices, procedures, and organizational structures. The figure shows that this adjustment can take place across multiple dimensions: reviewing information architectures, adapting to clear language, improving accessibility, reorganizing channels, incorporating feedback mechanisms, and revising communication protocols. From this perspective, the ICO goes beyond simply identifying barriers, introducing institutional capacities for organizational learning and continuous communicative adaptation (Schade et al., 2021).

However, the model explicitly emphasizes that this incorporation is neither automatic nor deterministic. The results hinge on contextual conditions: institutional capacity, political commitment, organizational routines, resource availability, and the socio-technological environment. These variables determine the extent to which evaluation evidence can be translated into effective organizational transformations. The literature on public innovation and participation has consistently shown that many participatory processes fail when organizations lack structures capable of consistently incorporating externally generated knowledge (Quick & Feldman, 2011; Soacha-Godoy et al., 2025). Therefore, the ICO does not assume that every evaluation necessarily leads to improvements; rather, it views participatory evaluation as a potential mechanism for institutional learning that is shaped by specific contexts.

6. Conclusions and Implications

The twin green and digital transition is reshaping how citizens engage with local institutions. Much of the research on digital governance, urban sustainability, and citizen participation has tended to view municipal communication as a functional support for public policies, rather than as an institutional infrastructure that shapes the practical intelligibility of those policies. This article offers a conceptual contribution aimed at addressing the communicative exclusion of older adults as a procedural issue tied to conditions of access, comprehension, usability, and participation in contexts of increasing communicative complexity.

The dynamics of communicative exclusion cannot be reduced solely to individual deficits in digital skills. The difficulties many older adults face when interacting with public administrations also stem from the design of the municipal communication infrastructures themselves: fragmented information architectures, cognitive overload, bureaucratic language, inconsistent terminology, digital environments that are difficult to navigate, and a lack of content tailored to this age group. From this perspective, communication exclusion represents a specific form of institutional inequality that impacts citizens' actual ability to understand procedures, identify resources, use public services, and participate in local governance processes (Bannister & Connolly, 2012; Molina Rodríguez-Navas et al., 2021).

This article proposes repositioning municipal communication as an object of participatory evaluation focused on older adults. Rather than approaches that focus solely on disseminating information or deploying technology, this article proposes conceptualizing communication as a procedural condition for participation. This reformulation entails shifting the focus from individual capacities for digital adaptation to the structural conditions through which institutions produce intelligibility, guidance, and communicative accessibility. In this regard, the article links the issue of municipal communication to broader discussions on procedural justice, collaborative governance, and institutional ageism (Fung, 2015).

Based on this analytical shift, the concept of ICOs is developed as a participatory infrastructure for evaluating municipal communication. The proposal goes beyond simply applying the logic of traditional citizen observatories to a new field; rather, it proposes a structural reinterpretation of these infrastructures to address less visible, more interpretative aspects closely tied to the intangible symbolic and procedural dimensions of public action. This conceptual shift allows municipal communication to become an object that can be observed, evaluated, and used for institutional learning.

The ICO model also incorporates a second contribution: redefining the role of older adults in local governance processes. Traditionally, this group has been portrayed as a passive recipient of services, an object of protection, or a vulnerable population that must adapt to digitalized environments. The ICO model introduces a significant epistemological shift: older people are now recognized as legitimate evaluators of municipal public communication. Their situated experiences become valuable as expert knowledge for identifying barriers that are often overlooked by conventional technical audits, particularly in matters related to navigability, procedural clarity, content orientation, and representational adequacy (Krick, 2022).

From this perspective, ICOs also help to challenge forms of digital and institutional ageism that often remain normalized within municipal communication systems and processes. Administrative complexity, fragmented channels, and cognitive overload are often viewed as secondary issues or difficulties stemming from individual digital literacy deficits. However, the model proposed shifts this interpretation and views these barriers as organizational outcomes stemming from institutional decisions regarding information architecture, communicative priorities, and procedural design. As a result, exclusion is no longer analyzed solely as a problem of older adults adapting to technology; rather, it is now conceptualized as a consequence of how institutions create conditions for accessibility, intelligibility, and communicative guidance (Chu et al., 2022; Rosales et al., 2023).

Older citizens participate not only by providing opinions on existing public policies, but also by influencing the communication conditions that make it possible to understand, utilize, and engage with them. Thus,

inclusion is no longer seen solely as formal access to information, but is linked to the actual ability to interpret and act within complex institutional environments (Emerson et al., 2012). At the same time, participatory evaluation helps identify symbolic forms of exclusion linked to the invisibility of older adults within municipal communication priorities, especially in areas related to sustainability, urban innovation, and digital transformation (Kong et al., 2025; Phillipson & Buffel, 2020).

However, the article demarcates the scope of its claims. The proposal developed is a theoretical construction model and has not been empirically validated to date. The ICO is presented as an analytical conceptualization aimed at identifying potential mechanisms for participatory evaluation and institutional learning. Its functioning depends on contingent factors such as organizational capacity, political commitment, and the degree to which participatory processes are institutionalized (Quick & Feldman, 2011; Soacha-Godoy et al., 2025). Likewise, the model has limitations stemming from the contextual and interpretative nature of municipal communication. Communication barriers and the institutional integration of evaluation results can vary significantly depending on the organizational, territorial, and social conditions of each municipality.

Given these limitations, the research sets a future agenda focused on empirical, comparative, and longitudinal analysis of how ICOs function in different municipal contexts, especially to examine the conditions under which participatory evaluation helps improve the intelligibility of municipal communication and the institutional capacity to respond (Groulx et al., 2021). Future research should advance the methodological operationalization of indicators related to cognitive accessibility, digital waste, communication noise, and content orientation, as well as the development of participatory auditing tools applicable to integrated municipal communication systems (both offline and online). It would also be relevant to explore the transferability of the ICO model to other groups affected by communication exclusion dynamics and to specific sectoral areas related to health, social services, urban sustainability, and e-government.

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Conflict of Interests

The authors declare no conflict of interests.

LLMs Disclosure

The authors used ChatGPT (OpenAI) as a large language model (LLM) based writing support tool. The LLM was employed to assist with language editing, translation from Spanish into academic US English, stylistic refinement, and structural clarification of arguments. All conceptual development, theoretical framing,

interpretation of sources, and final content decisions were conducted and validated by the authors. The authors assume full responsibility for the accuracy, integrity, and originality of the manuscript.

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ARTICLE

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A Participatory Future Scenario-Building Methodology for Europe's Just Transition by Sectors: The FITTER-EU Case

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Abstract

The twin transition—green and digital—is a European Commission priority, but it raises concerns of misalignment and unequal impacts. While foresight approaches are increasingly used to inform policymaking, there is still limited methodological guidance on how to systematically integrate vulnerability into participatory scenario-building processes. Policies may unintentionally generate disadvantaged groups, making a just transition essential. The Fair and Inclusive Twin Transitions for a Stronger Social Europe (FITTER-EU) project develops a scenario-building methodology to anticipate socio-technical transformations across four sectors (housing and built environment, transport and mobility, energy, and agriculture) in six countries (Spain, Germany, Hungary, Italy, Ireland, and Portugal). The methodology employed combines a multi-level perspective (MLP), distinguishing between niches (emerging innovations), regimes (established systems), and landscapes (macro-level contexts), with the PESTLE analysis (Political, Economic, Social, Technological, Legal, Environmental). This MLP-PESTLE framework is operationalised as both a conceptual and analytical structure, supporting the design of exploratory scenarios grounded in expert evidence, collected through semi-structured interviews and a Delphi survey of policymakers, civil society representatives, researchers, and private sector experts. Findings highlight the methodology's value for addressing unwanted impacts on societal groups, structuring the plurality of perspectives, and supporting its translation into three exploratory scenario configurations per sector (optimistic, neutral, pessimistic) by 2050. These scenarios represent alternative narratives of governance capacity, policy coherence, and social inclusion, reflecting different levels of achievement toward socio-technical transition objectives. This study contributes to the literature by providing a participatory methodological approach that integrates just transition considerations into foresight practices and tools for policymakers to foster anticipatory policymaking.

Keywords

Delphi method; foresight; interviews; just transition; policy impact; scenario building; socio-technical transformations; vulnerability assessment

1. Introduction

1.1. *The Twin Transition Policies and Social Vulnerability*

This article aims to develop and test a participatory scenario-building methodology that integrates vulnerability analysis into foresight processes to support anticipatory governance of the twin transition with social justice at its centre. The twin transition (combining green and digital transitions) has emerged as a central strategic priority of the European Commission (EC), shaping policy agendas across climate action, industrial strategy, innovation, and public administration (Muench et al., 2022; Terzi et al., 2023).

However, growing evidence suggests that the twin transition is neither socially neutral nor automatically inclusive (Crespy & Munta, 2023; Galgóczi, 2020). While each transition generates its own inclusion challenges—such as energy poverty in the green transition or digital exclusion in the digital transition—their interaction may amplify these risks, producing compounded forms of disadvantage (Aloisi, 2025). Moreover, inequalities are not only individual but also territorial. Regional disparities in infrastructure, institutional capacity, and access to funding shape the speed and direction of the twin transition, potentially reinforcing uneven development across the EU (Barbero et al., 2025; Fazio et al., 2025). Current implementations fail justice standards in most contexts due to narrow policy design focused on reactive compensation rather than holistic integration; insufficient stakeholder participation that amounts to tokenism (Crespy & Munta, 2023); inadequate funding that fails to provide necessary guarantees for workers (Pollin, 2023); and a lack of coordination between digital, green, and social dimensions (Crespy & Munta, 2023; Peretto et al., 2025). Moreover, current trends such as rising energy prices, digital-by-default service provision, uneven access to green technologies, and sectoral restructuring all pose risks for specific population groups (EC, 2022). For the purposes of this study, vulnerability is understood as a structural condition characterised by the combination of high exposure to stressors generated by socio-technical change and limited adaptive capacity arising from financial constraints, skills gaps, or employment precarity. Following Adger (2006) and Kehler and Birchall (2021), vulnerability is not an individual deficit but an outcome of policy design, institutional arrangements, and the differential distribution of transition costs and benefits across social groups and territories. Building on this, social inclusion is understood in this study as a multidimensional and institutionally-mediated condition, referring to equitable access to the opportunities, infrastructure, and decision-making processes generated by socio-technical change (Atkinson, 1998; Levitas, 2005). Inclusion is treated as a structural design criterion whose realisation depends on the alignment between governance arrangements, niche innovations, and regime reform (Geels & Schot, 2007; Wang & Lo, 2021).

In this line, the concept of a “just transition” has gained prominence as a response to these concerns, emphasising the need for fairness, inclusion, and the protection of vulnerable groups during structural transformations (EC, 2022). This concept claims the “need for transformative change ensuring that no individual, community or sector is left behind in the transition towards a sustainable future, both globally and locally” (Monaco, 2023, p. 1). Yet, just transition debates often focus on ex post compensation

mechanisms, rather than on anticipatory governance that is capable of identifying risks before they materialise. This reactive orientation limits policymakers' ability to prevent the emergence of new disadvantaged groups (Mandelli, 2022). These are understood in this study as those population segments whose combination of structural vulnerability and exposure to transition-induced stressors places them at heightened risk of bearing the costs of the twin transition without proportionate access to its benefits. The European Institute for Gender Equality (2016) and the European Centre for the Development of Vocational Training (2014) establish that disadvantage is not inherent to groups but is produced by structural conditions. In the context of the twin transition, Adger (2006) and Crespy and Munta (2023) extend this logic: Vulnerability and disadvantage are outcomes of how socio-technical change, governance design, and institutional arrangements distribute costs and opportunities unevenly across the population.

In this matter, anticipatory governance is key to addressing the harms that the twin transition has on societal groups by integrating foresight, participation, and reflexivity into policymaking processes (OECD, 2025). From this perspective, scenario-building is not merely a technical exercise but a governance tool that enables policymakers to explore alternative futures, assess distributional consequences, and adapt policy designs accordingly. In recent years, there has been a growing role for anticipation to guide future sustainability transformations (Muiderman et al., 2022), as it has emerged as an interdisciplinary agenda aiming to govern uncertain futures in the present (Muiderman et al., 2023).

The foresight literature also highlights the increasing methodological diversity of scenario-building approaches. Sossa et al. (2021), in a review of 66 foresight studies, found that scenarios are increasingly constructed through hybrid combinations of methods such as stakeholder analysis, roadmapping, PESTLE analysis (Political, Economic, Social, Technological, Legal, Environmental), backcasting, and participatory techniques, particularly in sustainability-related contexts. This reflects a broader shift from predictive exercises towards more participatory and exploratory approaches to managing uncertainty and supporting strategic decision-making (EC, 2023).

However, there is still limited methodological guidance on how to design scenario-building processes within the field of policy, despite their great potential. The OECD (2025) created the Strategic Foresight Toolkit for Resilient Public Policy, strengthening the need for evidence-informed anticipatory policy making in a changing world. The European Trade Union Institute also published a field manual on scenario building (Meinert, 2014). Both organisations acknowledge the need to support future-ready public policy, despite long-term uncertainty.

1.2. The Multi-Level Perspective and Its Application to Foresight

The multi-level perspective (MLP) has become one of the most influential frameworks for analysing socio-technical transitions (Geels, 2002, 2005; Rip & Kemp, 1997). It encompasses three key elements: first, the landscape, referring to environmental, social, and economic global trends that influence and pressure the regime; second, the regime, which refers to the mainstream society supported by social norms and already integrated systems (preserving the status quo); and finally, the niches, which consist of new ideas and innovations that can challenge the preexisting regime (El Bilali, 2019; see Figure 1). Transitions, under this framework, are conceptualised as the outcome of interactions across these levels.

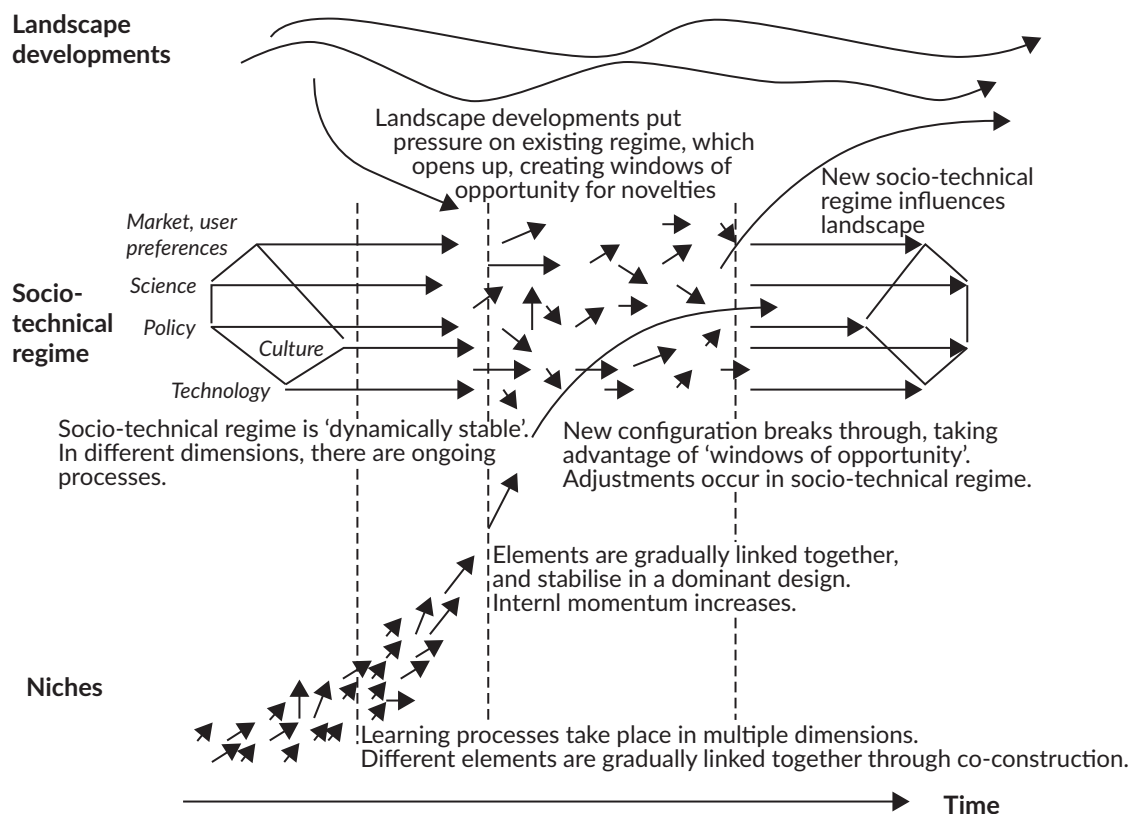


Figure 1. A dynamic MLP on system innovations. Source: Genus and Coles (2008), adapted from Geels (2004).

The MLP is particularly relevant for governance analysis because it highlights how structural change is shaped by institutional lock-ins, power relations, and path dependencies. Regime-level policies may stabilise existing inequalities, while niche innovations may benefit only those with sufficient resources, skills, or access. Landscape pressures, such as energy crises or extreme weather events, can further amplify vulnerabilities among specific social groups. Persson et al. (2025) recently claimed that the MLP can be beneficial for scenario planning thanks to the provision of a structure for understanding system dynamics and socio-technical change.

By making these interactions explicit, the MLP provides a useful conceptual lens for analysing how transition pathways may generate differentiated social outcomes and for identifying governance levers capable of steering transitions in more inclusive directions. In this article, the MLP is used as the overarching theoretical framework to examine the governance of the twin transition and to inform the design of exploratory scenarios across sectors.

The literature distinguishes between normative and exploratory scenarios in future studies (Börjeson et al., 2006; van Notten et al., 2003). While normative scenarios define desirable futures and pathways to achieve them (Robinson, 2003; Rotmans et al., 2000), exploratory scenarios examine multiple plausible futures under different uncertainties and socio-technical developments.

Within the context of the Fair and Inclusive Twin Transitions for a Stronger Social Europe (FITTER-EU) project, under the EU Horizon Europe programme (Grant Agreement no. 101132546), exploratory scenarios

are particularly relevant. FITTER-EU aims to support anticipatory governance by helping policymakers identify how Europe's green and digital transitions may affect different social groups, especially those at risk of exclusion. Through predictive and participatory tools, the project seeks to promote fairer and more inclusive policy design, making exploratory scenarios an appropriate approach to analyse potential future inequalities, risks, and opportunities associated with the twin transition.

Exploratory scenarios, according to Andreescu et al. (2013), emphasise the study of diverse future alternatives, depicting the range of possible outcomes. Thus, this research offers a unique opportunity to (a) experiment with the use of the MLP for the creation of this kind of forecasting, (b) create a novel methodology to build exploratory scenarios using the MLP, and (c) develop participatory methods to engage related stakeholders in the elaboration of these scenarios. To support these objectives, this article presents and reflects on a novel and participative scenario-building methodology developed within the FITTER-EU project, built upon Persson et al.'s (2025) insights. This makes use of the MLP for scenario building, tailored to the concrete needs and challenges that FITTER-EU is addressing, and ensuring it is evidence-based through the involvement of experts.

The novelty of the proposed methodology lies in three dimensions: (a) the systematic operationalisation of the MLP as a guiding conceptual and analytical framework within a participatory scenario-building process, going beyond its typical descriptive use in transition studies; (b) the explicit integration of vulnerability and just transition considerations as structural design criteria throughout the foresight process, rather than as ex post add-ons; and (c) the iterative triangulation of semi-structured interviews and Delphi surveys across multiple expert rounds, enabling progressive convergence while preserving interpretative depth.

Prior work (Meinert, 2014; OECD, 2025; Persson et al., 2025) addresses foresight methodology or the MLP in isolation, but does not combine them in a structured participatory process centred on distributional justice across sectors.

2. Method

This study adopts an integrated qualitative-quantitative foresight approach with the primary objective of developing and testing a scenario-building methodology suitable for anticipatory governance of the twin transition.

To narrow the sectoral scope into a manageable analytical dimension, an analysis of policy objectives was conducted. Although no common policy framework existed across the six member states (Spain, Portugal, Italy, Ireland, Hungary, and Germany), shared national policy objectives were identified through the review of 58 EU and national strategy documents (listed in the Supplementary Material). Four policy objectives linked to the twin transition were selected, one per sector: (a) digitalisation of agriculture, (b) transition to electric vehicles, (c) transition to renewable energy, and (d) climate adaptation of housing and the built environment. These objectives served as structuring topics for exploring uncertainties, drivers, barriers, stakeholders, and governance dynamics associated with each transformation pathway.

The scenario-building methodology followed a six-step iterative process combining qualitative and quantitative evidence to produce coherent exploratory narratives for 2050 (see Figure 2). While insights

from the six member states informed the analysis, the scenarios were developed at the EU sectoral level, focusing on sectoral transformation dynamics rather than cross-country comparisons.

The six-step process unfolded as follows: (a) a first round of semi-structured interviews to identify major trends, drivers, uncertainties, and vulnerabilities; (b) a first Delphi survey to elaborate and structure statements derived from interview findings and to assess preliminary convergence; (c) a second round of interviews aimed

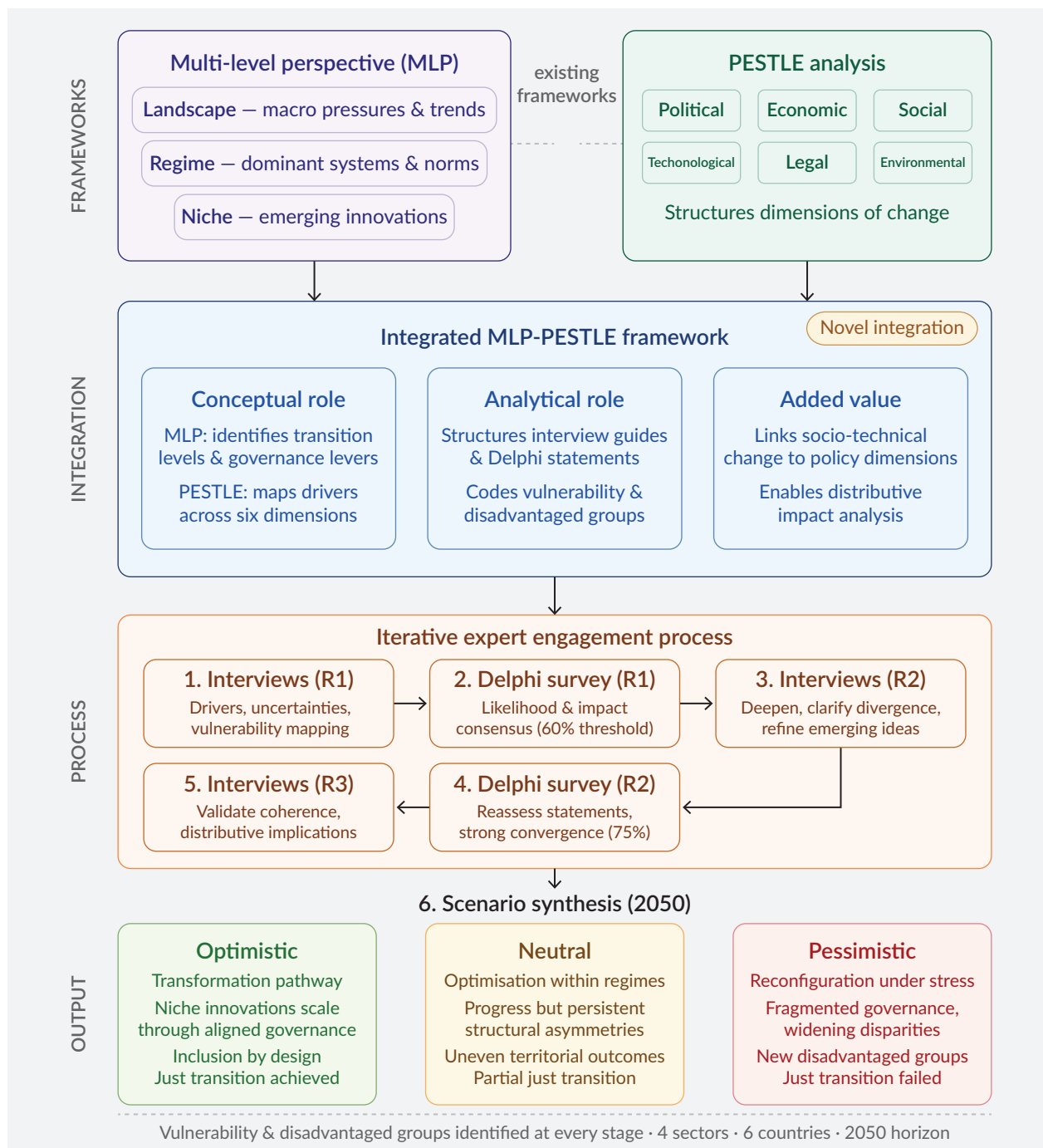


Figure 2. Scenario-building participatory methodology. Note: Developed by the authors; Claude.ai used for graphic design.

at deepening interpretation, clarifying divergences, and refining emerging key ideas based on Delphi #1 results; (d) a second Delphi survey to reassess updated statements and strengthen consensus patterns; (e) a third round of interviews focused on fine-tuning interpretations, validating coherence across sectors, and discussing distributive implications; and (f) a final synthesis into three exploratory future scenarios per sector.

To guide the comprehensive and comparable analysis across sectors, the MLP was complemented with a PESTLE framework (Aguilar, 1967; see Figure 2). This combination enabled systematic consideration of governance-related drivers, regulatory conditions, economic constraints, and social factors influencing sectoral transitions throughout the process. The MLP-PESTLE framework was used to structure the interview guide and the formulation of Delphi statements (Linstone & Turoff, 1975). For instance, interview questions were organised to elicit expert perspectives on key drivers, uncertainties, and expected developments within each dimension (e.g., technological innovation, regulatory change, social acceptance), and to explore their interactions across levels. Insights derived from the first round of interviews, coded according to this framework, were then translated into Delphi statements, maintaining alignment between the conceptual structure and the empirical data collection process.

2.1. Sample Description

A total of 86 experts contributed to the scenario-building through interviews and/or participation in the Delphi surveys (see Table 1). Of these, 24 participated in semi-structured interviews conducted by the two authors, and 62 took part in at least one Delphi round. Participation across phases was partially overlapping: 15 experts contributed to both the interview phase and the Delphi survey, while the remaining participants were involved in only one of the two components. This overlap was intentional, allowing continuity in reflection while simultaneously incorporating additional experts to broaden sectoral and geographical representation. Given the qualitative and foresight-oriented nature of the study, the objective was not statistical representativeness but analytical diversity across sectors, countries, and stakeholder types. These experts were part of the Cluster Community Group of Stakeholders created during the FITTER-EU project, which includes a wide range of stakeholders, policymakers, civil society representatives, sectoral experts, and representatives of disadvantaged groups, among others, reflecting the multi-actor nature of the twin transition. Additionally, during the interviews, the snowball technique was employed to identify additional experts. Each national representative partner was responsible for mapping and engaging the experts who were put in contact with the researchers.

Experts were selected through a purposive and iterative sampling strategy led by national partners, who identified relevant stakeholders based on their expertise, professional role, and involvement in key sectors (see Table 2). The sample includes a diversity of profiles, such as researchers, private sector representatives, policymakers, and practitioners. The composition of profiles varies across sectors and countries, reflecting structural differences in stakeholder ecosystems rather than the application of different selection criteria. Table 1 presents the aggregate distribution of roles, and the composition of each country is detailed in the Supplementary Material (Table 1), showing variations in stakeholder representation across national contexts.

Expert inclusion required: (a) a minimum of five years of demonstrated professional or research experience in the relevant sector; (b) a role directly connected to at least one of the four policy objectives under study (digitalisation of agriculture, electric mobility, renewable energy, or housing climate adaptation); and

Table 1. Description of the sample: Role categories.

Role category	Description	Share of sample (%)
Research and academia	Researchers, professors, scientific advisors, postdoctoral fellows, research officers, academic experts in socio-technical transitions	38.37%
Private sector and industry	Business developers, CEOs, engineers, consultants, project managers, technical experts, innovation and sustainability professionals	40.70%
Policy and public sector	Policy officers, public advisors, institutional representatives, regulatory and governance experts	9.30%
Civil society and practitioners	Farmers, cooperative members, practitioners, community-based actors and sectoral professionals with applied experience	11.63%

(c) availability for multi-round engagement. Representation of vulnerable groups and civil society was ensured through the FITTER-EU Cluster Community Group of Stakeholders, which explicitly included practitioners, cooperative members, and community-based actors. This was further facilitated by the consortium's composition: Several FITTER-EU partners are NGOs or organisations with established networks in initiatives where representatives of vulnerable groups play a central role. National partners were given specific guidance to balance profiles across researcher, private sector, public sector, and civil society categories, supported by ongoing monitoring of engagement levels and identification of underrepresented profiles. Nevertheless, structural differences in stakeholder ecosystems across countries meant that perfect symmetry was not achievable, as reflected in Table 2 and discussed under the study's limitations.

Table 2. Description of the sample: Experts per country and sector.

Country	Number of experts per sector	Total number of experts and geographical coverage in %
Spain	Mobility (12) Agriculture (8) Housing (6) Energy (7)	33 (38.37%)
Italy	Mobility (2) Agriculture (2) Housing (1) Energy (7)	11 (12.79%)
Hungary	Mobility (1) Agriculture (0) Housing (0) Energy (1)	2 (2.33%)
Ireland	Mobility (3) Agriculture (4) Housing (0) Energy (3)	10 (11.63%)

Table 2. (Cont.) Description of the sample: Experts per country and sector.

Country	Number of experts per sector	Total number of experts and geographical coverage in %
Germany	Mobility (3)	13 (15.12%)
	Agriculture (2)	
	Housing (3)	
	Energy (5)	
Portugal	Mobility (2)	13 (15.12%)
	Agriculture (3)	
	Housing (3)	
	Energy (5)	
EU Level	Mobility (3)	4 (4.65%)
	Agriculture (1)	
	Housing (0)	
	Energy (0)	

A total of 24 semi-structured interviews were conducted in three rounds to explore sectoral transition dynamics, governance challenges, and potential social implications of the twin transition. The interviews were structured in three blocks: horizon scanning, scenario building, and implications. Initially, experts were asked to list the factors that, according to the PESTLE dimensions, would still be important in 2050, what factors may still be reasonably certain in 2050, and what would be more uncertain. For the second block, the interrelation between factors was explored, focusing on their implications and the new opportunities and challenges that could arise from these interactions (MLP factors). Finally, the third block considered the identification of potential winners and losers of these scenarios. Our goal was to, following the wording of Meinert (2014), recognize and divide two types of factors: “givens,” the general assumptions that may continue to remain stable in the future; and “drivers,” the factors with more risk and uncertainty.

2.2. Data Analysis and Final Scenario-Building

Interview data were analysed using deductive coding with the Atlas.ti software based on the MLP-PESTLE categories, vulnerability dimensions, and identified disadvantaged groups. Insights from each interview round informed the formulation and refinement of Delphi survey statements and guided subsequent rounds of data collection. Two rounds of Delphi surveys were conducted, with a sample of 62 experts, to assess and refine key assumptions identified through the interviews. Statements were formulated in the future tense and evaluated by experts, with qualitative comments used to contextualise responses and capture uncertainty or disagreement.

To assess whether a Delphi statement reached expert consensus, a quantitative threshold based on the distribution of responses was applied. For each statement, experts evaluated two dimensions (likelihood and impact) using a five-point ordinal scale (“very low,” “low,” “neutral,” “high,” “very high”). Consensus was defined as being reached when at least 60% of responses fell within the two highest categories (“high” or “very high”) for a given dimension in a given round. This threshold was calculated relative to the total number of responses per statement and per round. If this condition was not met, the statement was classified as

showing no consensus. Likelihood and impact were analysed independently for each statement. In addition, an indicator capturing the percentage of “very high” responses among those who agreed (i.e., selected “high” or “very high”) was used to assess the strength of agreement within the expert group. Statements reaching consensus on likelihood were prioritised as robust signals for scenario development, even when consensus on impact was not achieved. The 60% threshold was selected as a pragmatic balance between inclusiveness and stringency, taking into account the heterogeneity of the expert panel across sectors and countries. In applied policy Delphi studies, consensus thresholds typically range between 55% and 75%, depending on panel size and diversity; the 60% criterion allows for the identification of convergent signals without artificially suppressing minority but potentially relevant viewpoints.

A higher threshold of at least 75% agreement in the second round was used to indicate strong convergence, signalling robust expectations among experts rather than initial alignment. This stepwise approach enabled differentiation between moderate consensus and consolidated agreement, supporting nuanced scenario construction. In parallel, statements were categorised according to their expected effect on the twin transition. Based on expert assessments and contextual interpretation, trends were classified as positive when they were expected to support both green and digital dimensions; negative, when they were likely to hinder transition dynamics; or mixed, when their effects could operate in different directions depending on context. This classification supported the interpretation of consensus results and informed subsequent scenario development. The complete table can be found in the Supplementary Material.

The final step synthesised the results of interviews and Delphi surveys, including the qualitative comments through deductive analysis, into three exploratory scenarios (optimistic, neutral, and pessimistic) for each sector based on the achievement (non, partial, or complete) of the policy objective within a just transition context, with a time horizon of 2050. This synthesis did not consist of a direct translation of individual Delphi statements into scenarios. Instead, the process combined the patterns of convergence and divergence identified in the Delphi rounds with the interpretative insights obtained in the third round of interviews. In this phase, interview evidence was used to validate, refine, and contextualise the emerging configurations, clarifying relationships between drivers, uncertainties, and governance conditions across sectors. Scenarios were thus constructed as internally coherent combinations of these elements, where consensus-based trends provided the backbone of each configuration and areas of disagreement or uncertainty were incorporated to differentiate between optimistic, neutral, and pessimistic trajectories. The final scenarios, therefore, represent analytically derived narratives grounded in iterative validation between quantitative convergence patterns and qualitative interpretation, rather than outputs directly extracted from a single stage of the process.

3. Results

3.1. *From Delphi Statements to Scenario Narratives*

The Delphi exercise generated a structured set of forward-looking statements reflecting expert assessments of the likelihood and impact of key developments related to the twin transition, derived from the interviews. These statements were subsequently interpreted through a normative lens, distinguishing between dynamics expected to support an inclusive and sustainable articulation of a just twin transition and those likely to hinder such alignment, that is, how different narratives were created (see Figure 3).

Across sectors, positive dynamics were associated with accelerated deployment of low-carbon technologies, expansion of digital infrastructures, consolidation of circular economy mechanisms, and the emergence of governance instruments capable of coordinating innovation and inclusion. From a PESTLE perspective, these dynamics were most often embedded in technological and environmental change, supported by political and legal steering instruments, and enabled by economic investment capacity. Negative dynamics were linked to rising transition costs, uneven infrastructure coverage, labour displacement due to automation, strategic dependencies on critical materials, and forms of digitalisation that risk reinforcing exclusion. These risks frequently reflected economic constraints, social vulnerability factors, and landscape-level pressures such as geopolitical instability and the climate emergency.

This classification provided the analytical foundation for constructing three internally coherent exploratory scenarios. When positive dynamics were assumed to scale coherently across sectors and to be supported by anticipatory governance, the resulting configuration corresponded to a transformation pathway in MLP-PESTLE terms, characterised by alignment between niche innovation, regime reform, and landscape adaptation (optimistic scenario). When both positive and negative dynamics coexisted under uneven implementation (neutral scenario), the pathway resembled optimisation within existing regime structures, with selective adjustments but persistent lock-ins. Finally, when negative dynamics accumulated and governance responses proved fragmented or reactive, the scenario reflected a reconfiguration under stress, where landscape pressures intensified while regime transformation remained incomplete and socially misaligned (pessimistic scenario). The complete scenarios can be found in the Supplementary Material based on a FITTER-EU report (Armayones Carranza & Viñé Rius, 2025a); a short summary is presented in the following section.

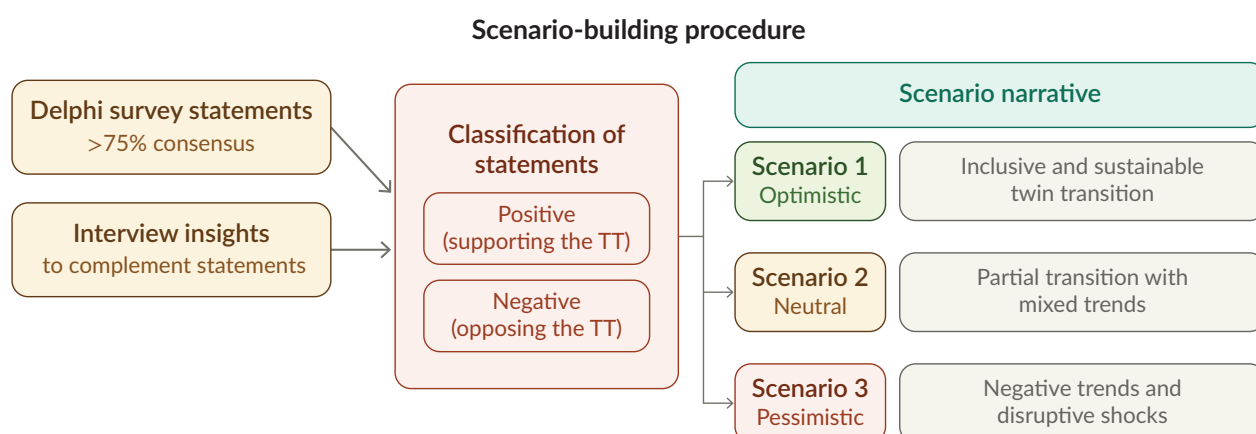


Figure 3. From Delphi statements to scenario narrative. Note: Developed by the authors; Claude.ai used for graphic design.

3.2. Optimistic, Neutral, and Pessimistic Scenario Dynamics

In the optimistic scenario, the twin transition develops through coordinated transformation across sectors. Technological innovation is supported by institutional reform, sustained investment, and governance mechanisms designed to prevent the emergence of new disadvantaged groups. Political commitment, regulatory clarity, and social safeguards reduce distributive risks.

A key feature of this pathway is the alignment between digitalisation and decarbonisation. Renewable energy systems are strengthened through smart grids, energy storage, and circular battery production, while digital platforms enable more participatory and community-based energy models. Technological innovations become progressively integrated into existing governance and market structures.

Electrified and service-based mobility systems are similarly supported by interoperable digital infrastructures and targeted reskilling programmes, limiting unemployment and regional decline during workforce restructuring. In rural and peripheral areas, integrated mobility solutions reduce transport poverty and improve access to services.

In the agri-food sector, cooperative digitalisation models lower entry barriers for small producers. Precision agriculture, traceability systems, and AI-supported irrigation improve productivity and environmental performance without concentrating benefits among large actors. Institutional support also prevents regulatory requirements from disproportionately affecting small farms.

Within the built environment, climate adaptation and digital innovation are combined with affordability measures and inclusive planning. Deep renovation strategies prevent displacement and maintain access to quality housing for low- and middle-income households, while universal accessibility standards are integrated from the outset.

Across sectors, inclusion is not treated as a compensatory add-on but as a structural design principle. Landscape pressures such as climate risks or geopolitical volatility act as catalysts for reform rather than as destabilising shocks. In MLP terms, this configuration reflects a transformation pathway in which niche innovations scale through coordinated political, economic, and legal support, reshaping regime structures in line with just transition objectives.

The neutral configuration is characterised by measurable progress in both green and digital dimensions, yet without fully overcoming structural asymmetries. Technological adoption proceeds at scale, but implementation capacity, fiscal resources, and administrative coordination vary significantly across territories and institutional contexts.

Renewable energy penetration increases substantially, although fossil fuels remain present as a backup in several systems, reflecting partial regime adaptation. Digital participation expands, yet connectivity gaps, usability barriers, and administrative complexity limit uptake among specific groups. Electrified mobility becomes mainstream in metropolitan areas, while peripheral regions experience slower infrastructure rollout and continued reliance on conventional vehicles. These differentiated outcomes reflect uneven interaction between technological innovation and socio-economic conditions.

In the agri-food sector, advanced digital tools and cooperative arrangements operate effectively in regions with strong institutional support, but remain absent or weakly developed elsewhere. Consequently, disparities persist between well-integrated producers and those operating outside formal support networks, indicating that regime change remains incomplete.

In the built environment, renovation and climate adaptation progress unevenly, generating spatial divergence between municipalities able to mobilise funding and those constrained by limited capacity.

Affordability protections are effective in some contexts but insufficient in others, leading to differentiated exposure to housing and climate risks.

Overall, this scenario reflects optimisation within existing regimes. Emission reductions and digital integration are substantial, yet inclusion remains contingent on local governance quality and economic resources. Political commitment and technological development are present, but economic and social dimensions are unevenly addressed. Structural inequalities are mitigated but not fundamentally transformed.

In the pessimistic configuration, negative dynamics accumulate, and governance responses fail to provide coherence or protection. Transition processes become fragmented, reactive, and unevenly financed, leading to widening disparities. Landscape-level pressures, such as climate extremes, geopolitical tensions, and supply chain disruptions, interact with economic constraints and weak political coordination, amplifying system fragility.

Renewable energy deployment slows due to infrastructure bottlenecks and material dependencies, while fossil-fuel reliance persists as a short-term stabilisation strategy. Grid fragility and exposure to extreme weather generate recurrent instability, illustrating how environmental and geopolitical factors at the landscape level can reinforce regime lock-ins when institutional capacity is insufficient.

Simultaneously, automation and digitalisation advance without adequate anticipatory reskilling. Labour displacement affects traditional manufacturing, logistics, and low-skilled agricultural roles, with insufficient transition pathways for affected workers. High-skilled employment opportunities concentrate in limited hubs, reinforcing regional polarisation and socio-economic segmentation.

Digital platforms increasingly replace analogue services across sectors; however, insufficient attention to accessibility, language support, and digital literacy exacerbates exclusion. Administrative complexity further restricts access to subsidies and support schemes, favouring actors with greater institutional capacity and reinforcing social inequalities embedded within the regime.

Housing affordability deteriorates in major urban centres, renovation remains incomplete, and climate adaptation is unevenly distributed, intensifying vulnerability to extreme weather events. In rural areas, insufficient infrastructure investment exacerbates transport and energy poverty, illustrating how economic and territorial disparities compound social vulnerability.

In this scenario, landscape pressures amplify rather than transform regime dynamics. The twin transition ceases to function as a driver of cohesion and instead becomes a vector of stratification, disproportionately affecting low-income households, renters, migrants, older adults, people with disabilities, and small-scale producers. This pathway corresponds to a reconfiguration under stress, where technological change occurs but fails to align with social and institutional reform.

3.3. Common Patterns and Differences Among Sectors

Several cross-sectoral patterns emerge from the comparative analysis. First, infrastructure coverage consistently operates as a primary determinant of distributive outcomes. Whether in relation to energy grids,

digital connectivity, charging networks, irrigation systems, or renovation capacity, access to enabling infrastructure shapes the ability of actors and households to participate in transition benefits.

Second, governance coherence proves decisive. Where political commitment, legal frameworks, and stable funding mechanisms are aligned, technological innovation translates into inclusive transformation. Where coordination is weak, even advanced technologies generate fragmented and unequal outcomes. This shows why it is crucial to guide or influence what happens in the regime, the dominant system, when using the MLP framework.

Third, labour market restructuring constitutes a shared vulnerability axis because it acts as a key transmission channel through which decarbonisation and digitalisation generate distributive effects. Across sectors, the twin transition tends to reallocate tasks rather than simply create or eliminate jobs, increasing demand for high-skilled technical and digital profiles while reducing reliance on routine and medium-skill roles. This shift interacts with existing occupational structures and regional labour market conditions, producing uneven exposure to displacement and unequal capacity to benefit from emerging opportunities.

A central risk lies in the mismatch between the pace of technological adoption and the adaptability of education, training systems, and social institutions. Where reskilling strategies are not anticipatory, territorially embedded, and closely aligned with sectoral demand, workers in carbon-intensive or routine-intensive occupations may experience prolonged unemployment, downward mobility, or labour market exit. These dynamics can reinforce polarisation, as high-value employment clusters in innovation hubs, while peripheral areas struggle to absorb transition shocks. Labour market outcomes are therefore not technologically predetermined but institutionally mediated. The interaction between technological change, active labour market policies, and social protection frameworks becomes decisive in shaping whether the twin transition mitigates or deepens socio-economic divides.

Fourth, digital access to transition-related services emerges as an ambivalent area across sectors. When embedded within inclusive design standards and supported by accessible interfaces and assistance services, it enhances transparency and efficiency. Conversely, when digital-by-default administrative platforms govern access to subsidies, information, or support without safeguards, they produce new exclusion mechanisms, thereby requiring inclusive regime reform.

Notwithstanding these commonalities, sector-specific sensitivities remain. The energy transition is particularly exposed to geopolitical material dependencies and grid stability challenges located at the landscape level. Mobility systems depend heavily on interoperability and business model integration to achieve systemic effects within the regime. Agricultural transitions are strongly shaped by farm scale and cooperative governance arrangements that influence the scaling of niche technologies. Housing outcomes are closely linked to property regimes, municipal capacity, and planning instruments, which determine how climate adaptation interacts with affordability in relation to private owners and public funding.

3.4. Identification of Disadvantaged Groups and Vulnerability Dimensions for the Pessimistic Scenario

The sectoral analysis allows for a more explicit identification of disadvantaged groups emerging across transition pathways. While the intensity of exposure varies across scenarios, recurrent patterns of

vulnerability can be observed within each sector, shaped by employment restructuring, skill requirements, and financial capacity.

In the energy sector, vulnerable groups include low-income households, renters, older adults, and digitally excluded individuals who face barriers to accessing renewable energy, smart systems, and subsidies. Workers in fossil-fuel industries and small energy producers are also exposed to transition and financing challenges.

In transport and mobility, workers in traditional automotive and logistics sectors risk displacement due to electrification and digital mobility. Low-income households, rural residents, and digitally excluded users may struggle with access to EVs, charging infrastructure, and digital transport services.

In agriculture, small-scale and older farmers face difficulties adopting digital and AI-based technologies, while seasonal workers may be affected by automation. Unequal access to finance, advisory systems, and innovation networks can further widen inequalities.

In housing and construction, low-income households, renters, and residents in climate-exposed areas are especially vulnerable to renovation costs and uneven adaptation measures. Digitally excluded individuals may struggle to access services and subsidies, while low-skilled construction workers risk instability if training does not keep pace with new requirements.

Across sectors, vulnerability rarely operates along a single dimension. Economic constraints, limited digital or technical skills, and exposure to labour market restructuring frequently overlap, producing cumulative disadvantage for specific populations. The emergence and intensity of these disadvantaged groups depend not solely on technological change but on how governance frameworks shape access to employment opportunities, training systems, and financial support mechanisms. Integrating this identification within scenario-building processes strengthens the anticipatory capacity of policymakers to address distributive risks before they materialise.

Taken together, the results indicate that the distributive consequences of the twin transition are institutionally mediated rather than technologically predetermined. A detailed table containing the main drivers, risks, disadvantaged groups, and governance implications by sector can be found in the Supplementary Material based on a FITTER-EU deliverable (Armeyones Carranza & Viñé Rius, 2025b).

4. Conclusions

The findings highlight the value of using the MLP-PESTLE framework as a conceptual and analytical tool for foresight processes. Its application reveals that the distributive consequences of the twin transition are determined by the degree of alignment between governance capacity, policy coherence, and inclusion mechanisms across sectors and territories. The methodology made it possible to systematically identify recurrent patterns of vulnerability, such as the interaction between labour market restructuring, infrastructure access, and digital exclusion, as well as cross-sector drivers that may otherwise remain fragmented or implicit in traditional analyses.

In addition, the iterative combination of interviews and Delphi surveys demonstrates the contribution of participatory and iterative methods for anticipatory governance, as claimed by Muiderman et al. (2022), to encompass the plurality of perspectives.

From a policy perspective, the proposed methodology offers a tool to help public institutions reflect on mechanisms to support anticipatory and evidence-informed decision-making. MLP-PESTLE is a theoretical methodology designed to assist policymakers in understanding unexpected consequences that a specific policy, through a regime change, might have. Thus, it can become a key tool during the problem framing and strategic assessment phase of policy design, for example when developing a policy planning procedure.

Concretely, the MLP-PESTLE framework and participatory rounds can be used by public administrations to: (a) identify potential transition-induced risks, and (b) support the design of mitigation and inclusion measures before policies are designed.

The MLP-PESTLE framework is, therefore, a tool that can be useful for any organisation related to policymaking that is interested in including an inclusivity perspective in its work.

At the same time, several limitations should be acknowledged. The uneven distribution of experts across countries and sectors introduces potential biases that merit explicit acknowledgement (Supplementary Material, Table 1). Countries with higher participation, particularly Spain, may have exerted greater influence. Sectors with lower engagement, such as housing and the built environment, offer less triangulated evidence and should be interpreted with greater caution.

This imbalance is partly structural: Stakeholder ecosystems in some national contexts are more densely organised. However, the iterative design of the methodology, combining three interview rounds with two Delphi surveys, partially mitigates this limitation by allowing emerging patterns to be validated and challenged across rounds.

Findings should therefore be understood as exploratory and indicative, not representative of national transition pathways. Future replications should aim for a more systematically balanced sample, ideally with a minimum quota per country–sector combination.

Beyond participation aspects, the approach relies substantially on expert judgement and qualitative interpretation. While expert-based foresight enables informed and forward-looking analysis, it may also reproduce dominant narratives. Also, focusing the analysis around policy objectives provides a necessary methodological anchor, but cannot fully capture the broader systemic complexity of socio-technical transformations. Sectoral futures are shaped by multiple interacting dynamics that extend beyond the achievement or non-achievement of a specific policy objective. The scenarios developed are therefore exploratory and context-dependent, intended to inform strategic reflection.

Future research could include the integration of complementary quantitative modelling tools, dynamic monitoring indicators, or system simulations to enhance analytical robustness. Expanding participation to informal citizens would also improve inclusiveness, as it would increase the total sample. Such extensions would further align anticipatory governance practices with democratic and socially embedded transition

processes. In addition, a larger and more systematically balanced cross-country sample could support more robust comparative analysis and enable the identification of context-sensitive national transition pathways and policy strategies.

Overall, this study provides a structured methodology for participative scenario-building under conditions of uncertainty. By operationalising an MLP-PESTLE framework and iterative expert engagement, it sets a coherent basis for future methodological refinement and policy-oriented foresight processes, fostering anticipatory policymaking to ensure a just transition.

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Conflict of Interests

The authors declare no conflict of interests.

LLMs Disclosure

ChatGPT (Premium) was used for language editing and stylistic improvement of the manuscript's text. Claude was used for the improvement of the graphical design of the figures.

Supplementary Material

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

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Parallel Transformations, Converging Practice: The Politics of Justice in Vietnam's Green and Digital Transformations

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Abstract

Vietnam is frequently portrayed as a climate governance frontrunner among Global South countries, having adopted an early Net Zero-emission-by-2050 pledge and multiple decarbonization policies. In parallel, the government has launched a digital transformation agenda with similarly bold ambitions. Although equity and inclusion language accompanies both agendas, they operate within a one-party political system marked by bureaucratic fragmentation and a strong economic development emphasis. This article examines how justice is articulated in Vietnam's green and digital transformations and identifies factors shaping these outcomes. It analyzes key policy documents and leadership speeches through a three-dimensional framework, encompassing recognition, distributive, and procedural justice, complemented by expert interviews. The findings indicate that while the green transformation is slightly more vulnerability-sensitive than the digital transformation, both ultimately follow similar structural patterns. While early green strategies are more people-centered and attentive to disadvantaged groups, these features are diluted in implementation and converge toward the digital agenda's consistently managerial-developmental pattern. Across both agendas, welfare-enhancing measures risk imposing adjustment burdens, while participation remains largely passive and symbolic. These uncoordinated agendas converge under shared structural constraints: policy integration limits, leadership influence, and international reputational-financial dynamics. The article develops this as the *parallel transformation* concept, an alternative to the twin transformation model, which associates such justice limitations with the market-oriented conditions of Global North liberal democracies and looks to departures from these conditions for a remedy. That they recur in Vietnam, a near-antipode of these settings, suggests their presence is not the cause of weak transformational justice, nor their absence its cure.

Keywords

Global South; green and digital transformation; just transition; parallel transformation; Vietnam

1. Introduction

Since the late 2010s, a global shift towards a low-carbon economy has been underway, often termed the green transformation (Kinley, 2017). In parallel, technological advances have accelerated a digital transformation of economic sectors, social services, and public administration (Priharsari et al., 2023). While their substance varies across countries, both processes are now widely analyzed through the lens of a just transition, whether as a goal, a co-benefit, or an organizing principle (this article uses “transformation” by default, reserving “transition” for proper names and the established term “just transition”). However, the justice dimensions of the two transformations are typically examined through different lenses: decarbonization-justice scholarship centers on who bears adjustment costs and who benefits from climate action, whereas digital-justice scholarship focuses on access and literacy, data privacy, and labor disruption from automation (Diodato et al., 2023; Pang et al., 2024). The two are thus rarely assessed against a common justice framework, even though, in many countries, state-led greening and digitalization proceed simultaneously and compete for limited resources in ways that directly affect the fairness of both. This is particularly relevant in developing countries without a liberal democratic governance system, where politico-economic constraints may exacerbate existing inequalities through rapid structural shifts.

At the same time, defining what constitutes a “green” or “digital” transformation remains contested. In climate governance, ambitious Net Zero pledges under the Paris Agreement are accompanied by modest policy implementation. In the digital sphere, the absence of a binding global regime gives governments wide discretion in defining what constitutes a “transformation” (Priharsari et al., 2023). Many countries thus adopt the rhetoric of transformation without undertaking structural reforms, which makes case selection consequential: meaningfully comparing justice across the two agendas requires a setting where both are backed by dense policy frameworks rather than rhetoric alone. Vietnam meets this requirement and allows the justice dimensions of its green and digital transformations to be analyzed through a single comparative framework within a one-party, developing-country setting. Since the Paris Agreement, Vietnam has approved a green transformation agenda comprising multiple green growth and climate policies, coupled with an early Net Zero-by-2050 pledge at COP26 in 2021 (Urban et al., 2018). In parallel, it has advanced an ambitious digital transformation agenda covering e-government, public services, e-commerce, and cybersecurity, positioning itself as an advanced digitalizing state relative to other lower-middle-income countries (Politburo of the Communist Party of Vietnam, 2024). Vietnam’s significance is not only empirical but theoretical. It governs both agendas through state-led developmentalism that absorbs every emerging policy domain into centralized planning (Benedikter & Nguyen, 2018); it is highly responsive to and actively courts international climate finance; and its one-party system under the ruling Communist Party falls squarely outside the ranks of liberal democracies. Existing scholarship that studies the green and digital transformations together has rarely elevated these structural factors to the analytical foreground, predominantly focusing instead on market-based, liberal democratic settings in the Global North while leaving their justice dimensions substantially unexamined. Vietnam, therefore, opens a broader theoretical question whose relevance extends beyond its Southeast Asian location: whether the pursuit of justice in these transformations is shaped less by the liberal democratic market conditions taken as baseline by the dominant scholarship than by a state-led developmental logic influenced by external financial incentives. This article therefore asks:

RQ: How is justice articulated in Vietnam’s green and digital transformations, and how can the observed patterns be explained?

To answer the research question, the study conducts a qualitative analysis of key policy documents and leadership speeches, complemented by expert interviews, through a three-dimensional green-digital justice framework encompassing recognition, distributive, and procedural justice. The findings show that while the two transformations differ in emphasis, they ultimately converge in their structural justice patterns, with both operating within a developmentalist governance framework. The digital agenda consistently recognizes justice as inclusion in digital services and economic platforms, with distributive measures benefiting generic, undifferentiated social and economic actors. While some green strategies acknowledge decarbonization-driven socio-economic disruptions and vulnerabilities facing disadvantaged groups, these elements are mostly diluted in sectoral implementation plans, bringing them closer to digital justice patterns. Across both agendas, there are many distributively ambivalent measures presented as welfare-enhancing while potentially imposing adjustment burdens; procedural justice, meanwhile, remains symbolic with a weakly identified participant base. Despite a near-absence of cross-agenda coordination, these converging justice patterns reflect the structural influence of policy integration constraints, the role of national leaders, and international reputational-financial dynamics.

These findings allow the article to make two contributions. Conceptually, it develops the “parallel transformation” concept: a governance configuration in which green and digital transformational agendas advance simultaneously under shared structural constraints yet without meaningful coordination, as an alternative to the integrated “twin” model. Theoretically, it shows that the justice limitations that the “twin” transformation scholarship ties to the market-based conditions of Global North liberal democracies can also arise in their near-antipode, indicating that those conditions are neither the cause of weak transformational justice nor their absence its cure.

The rest of the article proceeds as follows. Section 2 reviews research on the green and digital transformations and the Vietnamese case within each, examines these literatures against the emerging twin transformation scholarship, and introduces the three-dimensional justice analytical framework. Section 3 sets out the methodology, Section 4 presents the findings, and Section 5 explains the observed patterns. The conclusion reflects on the study’s implications for governing a just, parallel transformation in a developing-country context.

2. Vietnam’s Green and Digital Transformations in the Context of Justice

This section analyzes research on the green and digital transformations and the Vietnamese case within each, examines the emerging twin transformation scholarship, and introduces the justice framework that guides the analysis. Although Vietnam’s transformations are often invoked in official speeches and state-affiliated media, neither has a formal legal definition specifying its scope, which shapes the limitations of existing research. They differ, however, in that the green agenda is anchored in an international regime and clear sectoral boundaries, while the digital agenda is not, a contrast that conditions how justice can be traced in each. Against this background, the section asks whether the integrated twin model fits the Vietnamese case and proposes “parallel transformation” as an alternative.

2.1. Green Transformation

Given the green transformation's focus on socioeconomic decarbonization, this article attends to policy-induced injustices. While no universal definition of a "green transformation" exists, commitments to limit global warming to 1.5°C by 2050 under the Paris Agreement offer a widely accepted benchmark. Under this framework, countries submit progressively more ambitious nationally determined contributions (NDCs) specifying mitigation targets across multiple greenhouse gas-emitting sectors, whose boundaries provide a basis for identifying national green transformation policies and assessing their justice implications.

Even so, the scope of national green transformations varies, with countries prioritizing different emitting sectors and maintaining overlapping green growth, energy, and sustainable development strategies, as in Vietnam (Urban et al., 2018). To ensure analytical clarity, this article conceptualizes Vietnam's green transformation as comprising two policy clusters: green growth and climate change mitigation, each anchored in national strategies and action plans (Khoi-Hoang, 2023). Although adaptation and sustainable development goals strategies exist, the former is excluded because this study focuses on mitigation-induced socioeconomic restructuring, and the latter predominantly recycles existing sectoral commitments (Minh-Ha, 2023).

Climate justice scholarship highlights the disproportionate impact of climate change on groups that contribute the least and possess the weakest coping capacities. When mitigation policies themselves impose burdens on vulnerable groups, this produces a "triple injustice" (Krause, 2018). Existing research on Vietnam's green transformation rarely addresses justice and faces two limitations. First, conceptual definitions vary widely. Some studies treat the transformation expansively, encompassing circular economy and traditional sectoral policies, while others equate it narrowly with energy transition (Minh-Ha, 2023). Second, most works either catalog policies or run *ex ante* scenario modeling; few critically analyze the corpus, much less provide causal explanations. An exception is Khoi-Hoang (2023), who finds stronger justice commitments in the National Green Growth Strategy than in the National Climate Change Strategy. Despite numerous action plans since, the literature has not moved beyond these original strategies' theoretical implications. Given Vietnam's bureaucratic fragmentation (Benedikter & Nguyen, 2018), whether early commitments survived implementation is a crucial question this study addresses by analyzing strategic and sectoral documents through a unified framework, tracing how justice commitments travel across almost five years of implementation.

2.2. Digital Transformation

Unlike the green transformation, there is neither a coherent international digitalization regime nor a widely agreed long-term objective comparable to carbon neutrality. Digital transformation, therefore, lacks clearly defined sectoral boundaries and is conceptualized differently across development contexts. In middle-income countries, digital transformation typically prioritizes infrastructure, digital public services, cashless payments, and national databases (Priharsari et al., 2023), a profile reflected in Vietnam's key policy documents such as the National Digital Economy and Society Strategy (Prime Minister of Vietnam, 2022c) and the Resolution on Scientific Development and National Digital Transformation (Politburo of the Communist Party of Vietnam, 2024).

Adopted after Covid-19 underscored digital technologies' potential, Decision 411/QĐ-TTg defines the transformation as the digital economy (e-commerce, digital contracts, workforce development) and the digital society. The latter combines social metrics, such as use of digital public services, online medical consultations, and digitalized teaching, with economic indicators like smartphone ownership. Resolution 57 further embeds digital transformation within the broader "era of national rise" political vision, emphasizing its role in national modernization and competitiveness. Cybersecurity and data localization also receive central emphasis, as Vietnam's Public Security Ministry has actively pushed through legislation in these fields to ensure political stability under Communist Party leadership (Dien, 2022). On this basis, this article delineates Vietnam's digital transformation as comprising three major domains: (a) digital public services; (b) digital economy; and (c) cybersecurity and data protection.

Digital justice debates frequently center on inclusion, privacy, labor disruption, and the digital divide (Diodato et al., 2023; Pang et al., 2024). However, what constitutes "justice" in digital transformation remains more diffuse than in climate governance due to the absence of binding global objectives and sectoral delineation. This ambiguity means that digital justice scholarship often focuses on discrete technologies or issue areas rather than examining sectoral and thematic policy domains. Existing research on Vietnam's digital governance focuses primarily on media censorship and facial recognition technologies (Dien, 2022). These studies illuminate digital governance's most intrusive aspects but rarely situate justice within the broader transformational agenda. Moreover, no study systematically compares justice patterns across digital and green transformations within one governance system. Increasingly, however, the two are theorized not in isolation but as a single coupled process, a literature this study must situate itself against.

2.3. *Twin Transformation*

The green and digital transformations, long studied as separate domains, have increasingly been linked under the notion of a twin transformation (Diodato et al., 2023). This emerging scholarship includes optimistic accounts, which treat digitalization as an enabler of decarbonization, alongside critical strands that examine the power relations and economic interests underpinning the twin transformation. Across both strands, the social and justice dimensions of the transformations have received comparatively little systematic attention relative to their environmental and economic ones (Paraná & Santaella-Gonçalves, 2026).

Two interconnected limitations pervade this emerging scholarship. Geographically, it is centered on the EU and, more broadly, the Global North, largely because the EU is the first to have adopted an explicit official twin transition agenda, making it both the empirical and normative template for the field (European Commission, 2022). Epistemologically, the literature identifies the market-based, corporate-led organization of the transformation as the source of its justice failures, so that even its prescriptive contributions are framed as departures from that market-based status quo (Paraná & Santaella-Gonçalves, 2026). These two tendencies manifest together across three connected lines of inquiry. First, much critical scholarship concentrates on US-based Big Tech and the market-oriented framing of change, exposing how corporate actors steer the transformation toward their own benefit (Paraná & Santaella-Gonçalves, 2026; Rikap & Weko, 2025). Second, injustice is construed as one-directional, with Global North corporations extracting value from or imposing technological dependency on the Global South; this casts Southern societies chiefly as victims and overlooks Southern governments' agency in directing their own populations through state-led transformation (Moore et al., 2026; Paraná & Santaella-Gonçalves, 2026). Third, the alternatives proposed to

remedy this market-led transformation do not reform it from within but seek to move beyond Big Tech-driven market dynamics altogether, through commons-based or democratically planned arrangements advanced in European debates. It is unclear, however, whether these proposals are relevant in settings that are not market-driven to begin with, but are instead state-led and developmentalist (Durand, 2026; Nardelli & Santaella-Gonçalves, 2025).

Furthermore, this scholarship reveals a fundamental tension: in invoking a twin transformation, it presumes that the two processes are converging or have already converged, yet it continues to approach them separately, so that the green and digital research strands remain largely unconnected even when included in the same study (Müller et al., 2024). Where it does acknowledge their separate development, it tends to treat this as a deficiency rather than a condition worth examining in its own right, or as a transitional stage for latecomer economies to outgrow by aligning the two strategies (United Nations Conference on Trade and Development, 2023), or as a gap to be filled through coordinated research and government interventions (Daehlen, 2023).

Because parallel development is approached as a deficiency, it has not been examined as a governance configuration with a logic of its own. Integration on this scale demands a coordination capacity that even the EU has struggled to achieve, making the twin transition a normative goal rather than an empirical outcome (Aloisi, 2025). Consequently, developing countries with thinner capacity, such as Vietnam, are even less likely to pursue it as a deliberate strategy. Moreover, because the twin model presumes the market-based and liberal democratic conditions of its European origin, it travels poorly to settings shaped by different political and economic logics. This suggests that parallelism should be reconsidered not as a short-term defect but as a stable transformational model in its own right. This article, therefore, proposes the concept of *parallel transformation*, where green and digital agendas advance simultaneously under shared structural constraints yet without meaningful coordination. It is offered as a category potentially better suited than the twin transformation model to settings such as Vietnam's. An alternative that the empirical analysis then assesses.

2.4. Green and Digital Justice: An Analytical Framework

To analyze justice across these parallel transformations rather than presume their integration, this study applies a common framework. Three dimensions commonly structure justice analysis in transformational policies: recognition, distributive, and procedural justice (McCauley et al., 2013). Frequently applied in climate and environmental research, they have clear parallels in digital justice scholarship, where the same dimensions concern protected values, inclusive governance, digital divides, and beneficiaries' identification (Kolotouchkina et al., 2024; Pang et al., 2024).

2.4.1. Recognition Justice

Recognition justice concerns whether the values, needs, and preferences of social groups are acknowledged and embedded in policy design (Schweiger, 2019). Though often associated with identity politics (Murphy et al., 2022), recognition directly shapes material and representational (in)equalities and underpins fair redistribution and participation (Walker & Day, 2012).

The first recognition component examines a policy document's prevailing policy discourse, which influences the legitimation of socioeconomic concerns and the identification of groups targeted for distributive

measures and involvement in policy deliberation processes. Following Di Gregorio et al. (2017), this article distinguishes three framings: ecological/digital modernization, civic environmentalism/civic digital transformation, and green/digital governmentality. Modernization emphasizes win-win growth and state steering, in a weak form focused on technological fixes and modest reforms or a strong form entailing broader institutional change and more democratic decision-making. Civic framings prioritize empowering diverse groups in a reformist form that includes excluded groups as participants or a radical form that holds the prevailing order inherently inequitable and in need of fundamental transformation. Governmentality centers on techno-scientific expertise and administrative optimization, in an elitist variant emphasizing top-down control and a reflexive variant allowing some social engagement (Di Gregorio et al., 2017). While modernization has long dominated Vietnam's official environmental discourse, there are signs of a shift towards a more people-centered narrative, which justifies applying this tripartite framework to both green and digital transformation policies (Khoi-Hoang, 2023).

The second component assesses recognition, misrecognition, and non-recognition. Recognition explicitly acknowledges which social, cultural, environmental, or economic concerns are considered relevant in the transformation (Murphy et al., 2022). Misrecognition captures cases in which a document does engage a need or value but defines it vaguely, forcibly imposes it, or misaligns it with the predominant preferences of affected groups, while non-recognition denotes documents that acknowledge no needs or values at all (Schweiger, 2019). Together, these components reveal how policy discourses shape which needs and values are deemed legitimate in Vietnam's green and digital transformations.

2.4.2. Distributive Justice

Distributive justice in a transformational context refers to efforts to equitably spread the benefits and burdens of decarbonization and digitalization. In climate mitigation scholarship, it addresses the risk of shifting mitigation costs onto those least responsible for emissions and least able to bear adjustment burdens (Krause, 2018). In the digital realm, distributive justice addresses both access and work. The former concerns the unequal distribution of digital infrastructure and skills, the focus of digital-divide debates. The latter concerns how digitalization reshapes employment itself: automation, on-demand platform work, and crowd work concentrate value with platform owners while leaving workers with precarious, variable, and weakly protected jobs (Valenduc, 2019).

Distributive policies can either promote benefits or lessen the burdens engendered by transformational changes. Although both directions aim to ensure citizens' welfare, they risk perpetuating climate-digital injustice if benefits are delivered to already advantaged groups and ills are distributed to those with the least coping capability. Thus, the distribution dimension can be divided into promotion of benefits, mitigation of vulnerabilities, and ambivalent distribution. The last category is needed because some measures, framed as unequivocal benefits or rights, in practice, extend government oversight or shift adjustment costs onto recipients, functioning as burdens themselves.

Each category is further divided into distribution targets and distributive measures. Justice scholarship stresses not only what is distributed but also who receives it, guided by criteria of merit, needs, and equality. Whereas recognition concerns the material and socio-cultural conditions to be achieved, distribution concerns the measures that mitigate losses or improve benefits used to achieve them.

2.4.3. Procedural Justice

Procedural justice refers to fairness in the process through which diverse social groups participate in the governance of transformational policies that affect their livelihoods. The literature often employs three pillars for analysis: information disclosure, participation in decision-making, and access to legal process (Walker & Day, 2012), which are in turn based on the 1998 Aarhus Convention. Information disclosure equips communities to adapt and influence policymaking, participation methods let them shape policies affecting their identity and livelihood, and access to legal process allows them to monitor implementation, challenge decisions, and seek compensation.

Based on such insights, this study operationalizes procedural justice through two components: procedural rights and participant base. The first component identifies the information, participation, and legal access rights that empower actors in the policy process, as discussed in the preceding paragraph. Although some Vietnamese documents group information mechanisms together with distributive instruments (Politburo of the Communist Party of Vietnam, 2024), they are treated here as participatory instruments consistent with academic usage (McCauley et al., 2013). The second component refers to the various social segments empowered to take part in the governance of the two transformations, often identified in the same textual provisions as the first component.

3. Methodology

This study applies qualitative thematic analysis to 47 policy documents and leadership speeches on Vietnam's green and digital transformations, guided by a green-digital justice framework, and then uses 15 expert interviews to explain the patterns found. Thematic analysis is well suited to identifying patterns across a large body of policy texts while preserving the discursive detail in which justice claims are made. It can also operate at both the semantic level of explicit policy provisions and the latent level of underlying discourses that shape which provisions are made and what they treat as just (Braun & Clarke, 2006). The framework is applied deductively in coding, with both corpora coded against the same pre-specified categories so that their justice patterns are directly comparable, while the explanation of those patterns in Section 5 is built up from the interview and contextual evidence.

3.1. Data Collection

For the analysis, 47 policy documents and leadership speeches were selected: 26 in the green corpus and 21 in the digital corpus. Green transformation materials mostly include national green growth and climate strategies, follow-up ministerial action plans, and prime ministerial directives. Digital transformation materials include Communist Party resolutions, laws, strategies, and action plans across the domains identified in Section 2. Five public speeches by the prime minister and the Communist Party's general secretary are also included. All policy documents and speeches are included in Supplementary File 1.

All documents, except the English-language Just Energy Transition Partnership Resource Mobilization Plan (JETP-RMP), are in Vietnamese. In addition, 15 semi-structured expert interviews were conducted between 2024 and 2026 with central-government policymakers, academics, and representatives of development agencies, research institutes, business associations, and civil-society organizations involved in the two

transformations. These interviews serve two roles. Their primary role is explanatory—because interviewees are directly involved in advising on or drafting these policies, they can account for why justice provisions took the form they did. This explanatory evidence is developed in Section 5. Their secondary role is triangulation—where a document's intent is ambiguous or where formal provisions appear to diverge from practice, interview testimony corroborates the textual reading, as in the analysis of consultation processes in Subsection 4.3.

Both the documentary corpus and the interviewees were selected purposively. Documents were chosen to cover the strategic and sectoral instruments across the green clusters and digital domains delineated in Section 2. Interviewees were selected for their position and expertise relevant to these transformations; most were introduced to the author through established contacts in the field, notably a senior researcher at the Vietnam Academy of Social Sciences, with a small number of further referrals who met the same criteria. As experts on national policy, they are predominantly based in Hanoi, Vietnam's capital. While most interviews centered on the green transformation, several respondents raised the digital transformation of their own accord. Two further interviews, conducted in early 2026, focused specifically on the digital transformation.

3.2. Data Analysis

A three-dimensional green-digital justice framework guides the analysis of collected policy documents and speeches, based on the insights discussed in Section 2 (see Table 1). The detailed codebook and results can be found in Supplementary File 2. Because the article is concerned with domestic implications, international justice provisions are not included.

Provisions for the three dimensions typically appear within a single Vietnamese policy document. Recognition framing, priorities, needs, and values appear in introductory principles and objectives; distributive provisions under “tasks and solutions” or “responsibility assignments,” which identify target groups and mechanisms; and procedural elements partly alongside distributive provisions and partly under organizational responsibilities.

Coding was conducted using NVivo from November 2025 to January 2026 by the author and an assistant coder. An intercoder reliability test on five documents yielded over 85% agreement. All coding was subsequently reviewed by the author. Identified justice patterns are then explained through interview evidence and scholarship on policy integration, justice, and Vietnam's political economy.

Table 1. Three-dimensional green and digital justice analytical framework: dimensions, components, and their operationalization.

Justice dimension	Definition	Components	Operationalization
Recognition (see Subsection 2.4.1)	Acknowledgement of economic, governance, cultural values, and needs deemed socially relevant	(a) Dominant policy discourse	1. Ecological/digital modernization – Strong form – Weak form
			Or
			2. Civic environmentalism/civic digital transformation – Reformist form – Radical form
			Or
Distributive (see Subsection 2.4.2)	Allocation of benefits and burdens	(b) Recognized needs and values:	3. Green/digital governmentality – Reflexive form – Elitist form
			– Non-recognition
			Or
			– Recognized needs and values – Misrecognized needs and values
Procedural (see Subsection 2.4.3)	Empowering social segments to participate in policy development and implementation	Benefit-promotion	– Distribution targets – Distributive measures
		Loss-mitigation	– Distribution targets – Distributive measures
		Ambivalent distribution	– Distribution targets – Distributive measures
Procedural (see Subsection 2.4.3)	Empowering social segments to participate in policy development and implementation	(a) Procedural rights	Information disclosure; participation in policymaking; access to legal process
		(b) Participants	Social groups involved in governance process

Note: Each dimension's categories are defined in the subsection indicated.

4. Findings

All three justice dimensions receive heavy coverage across both transformations, with every document referencing at least one. Despite slight initial differences in emphasis, the transformations' overall justice patterns converge (see Table 2).

4.1. Fragmentation and Consistency

Vietnam's transformations are development-oriented but occupy different positions along a continuum. The green transformation displays a relatively stronger civic orientation and attentiveness to transformation-induced vulnerabilities, whereas the digital transformation is more consistently developmentalist, prioritizing qualities that advance the transformation itself. This does not imply that green

Table 2. Summary of coded justice patterns across Vietnam’s green and digital transformations.

Dimension	Green transformation	Digital transformation
Recognition justice	<u>Framing:</u> Early civic/reflexive governmentality; later technocratic modernization	<u>Framing:</u> Digital modernization, elitist governmentality
	<u>Recognized needs/values:</u> Decarbonization-related disruptions; some development qualities	<u>Recognized needs/values:</u> Transformation-enabling qualities; limited attention to disruptions
Distributive justice	<u>General logic:</u> Primarily benefit-promotion; sporadic vulnerability-mitigation; some ambivalence	<u>General logic:</u> Consistent benefit-promotion; strong ambivalence
	<u>Measures:</u> Indirect financial, employment, and educational instruments	<u>Measures:</u> Direct state provision of services/platforms
	<u>Targets:</u> Mainly equality-based; limited need-based	<u>Targets:</u> Predominantly equality-based; limited merit-based
Procedural justice	<u>Procedural rights:</u> Predominantly information provision, minimal consultation/legal access	<u>Procedural rights:</u> Predominantly information provision, minimal consultation/legal access
	<u>Participants:</u> Generic base; limited vulnerable-group inclusion	<u>Participants:</u> Rhetorically broad but substantively generic

policies are inherently people-centered; rather, it reflects discursive fragmentation within the green agenda and the more uniform framing of the digital agenda.

Within the green transformation agenda, recognition framings are unevenly distributed. The ecological modernization frame appears in only 3 documents, in its weak form, suggesting that co-opting decarbonization for growth is not the prevailing rationale. Five documents display the reformist tendency in civic environmentalism—including the National Green Growth Strategy, JETP-RMP, and speeches by Vietnam’s prime minister. Policy documents tend toward a more technical-managerial, developmentalist discourse the more concrete they get: ministerial action plans discuss sectoral greening benefits almost to the exclusion of societal ones. Finally, four green documents contain no discursive frame, against only one in the digital corpus.

Digital documents exhibit a stronger, more consistent nationalist-developmental orientation, concentrated around digital governmentality (14 out of 21 documents) and digital modernization (seven out of 21 documents). High-level resolutions, national strategies, and leadership speeches frame Vietnam’s digital transformation as a new “mode of production” closely linked to economic growth, administrative efficiency, and national security (To Lam, 2024). A recurring theme is the use of technology to enable an “era of national rise” (Politburo of the Communist Party of Vietnam, 2024). While civic digital transformation is non-existent, nine documents elaborate on technological applications’ role in increasing citizens’ satisfaction and comfort, a reflexive form of digital governmentality.

These frames shape the needs and values each agenda recognizes. Green policies emphasize basic socioeconomic conditions affected by decarbonization, energy and food security, green jobs, and, in later

documents, income security and mobility, whereas digital policies prioritize needs that facilitate the transformation itself, privacy and data protection, access to science and technology, digital jobs, and platform inclusion.

Both agendas show considerable non-recognition and misrecognition: eight green and two digital documents identify no needs or values tied to any social segment, and six green and five digital articulate them vaguely or contestably. In the green transformation, misrecognition often frames pollution from private road transport as an urban public health concern (Prime Minister of Vietnam, 2025). This downplays emissions from coal power and industry and disregards the mobility needs of residents who commute mainly by gas-powered scooters, making clean air less a social concern than a legitimating device for vehicular electrification. In the digital corpus, misrecognition often takes the form of imposing standardized cultural values. The National Strategy for Digital Economy and Society (Prime Minister of Vietnam, 2022c), for instance, defines the Vietnamese digital culture through measurable engagement with online public services, digital healthcare, and education, while tasking the state with guiding citizens to “selectively absorb” global values and avoid digital risks. Such framings narrow recognition to behavioral and economic alignment with policy objectives rather than pluralistic empowerment.

4.2. Universalization of Benefits

Two distinct distributive patterns stand out across Vietnam’s green and digital transformations. First, distributive justice is overwhelmingly conceived as the promotion of benefits rather than the mitigation of vulnerabilities. Second, a considerable subset of distributive measures is framed as improving welfare but, in practice, imposes new compliance and adjustment burdens.

Benefit-promoting measures appear in 23 green and 18 digital documents. In the green transformation, they are largely enablement-oriented, dominated by capacity-building, education, financial support, and green public procurement measures. By contrast, the digital transformation assigns the state a more interventionist role, led by e-government services, technical training, platformized education and healthcare, cashless payment, and e-commerce systems. Thus, green policies tend to facilitate adaptation to decarbonization, while digital policies view distribution as the provision of access to state-coordinated systems and infrastructures.

Recipients are predominantly universalistic, most often the “whole of society,” alongside broadly defined skilled and business actors. The first reflects an equality-based logic, with benefits presumed to reach all citizens through awareness-raising, education, and public services; the latter two carry a limited merit-based dimension, extending capacity-building and financial support to actors presumed able to contribute. Yet even here, categorization remains generic: “skilled actors” are loosely defined as researchers or professionals, while “business actors” are not differentiated by size or state/private ownership. Needs-based targeting is even rarer. In the green agenda, farmers, workers, and specific regions are sporadically identified as recipients of financial, educational, or self-management support, extending benefits beyond already advantaged groups. In the digital agenda, medical patients, social security recipients, and students are mentioned, but mainly for access to digitalized services embedded in sectoral plans rather than in higher-level documents. Both agendas thus sit at the equality-based end of the distributive spectrum introduced in Subsection 2.4.2, with benefits presumed to reach all citizens alike, rather than directed to those least able to bear adjustment costs.

Only six green and three digital documents contain instruments to alleviate the distribution of transformation-induced burdens, and none is dedicated exclusively to vulnerability mitigation. Even where a burden is clearly identified, the remedy offered is often one that would not obviously lessen it. The National Strategy for Digital Economy and Society, for instance, qualifies as loss-mitigating because it seeks to lessen the poverty of ethnic minorities amid the disruption that a digital economy brings to their livelihoods; yet its proposed remedy, e-commerce training to “make each citizen an entrepreneur,” does not shield them from that disruption but instead enlists them in the very process driving it (Prime Minister of Vietnam, 2022c, p. 2). This typifies how the digital agenda treats labor throughout: work appears as talent attraction, job creation, and e-commerce entrepreneurialism, while the disruptive dimensions in digital-justice debates such as automation, job degradation, and the precarity of platform-mediated work are effectively absent; only Resolution 50 acknowledges technological displacement as a risk, and there merely as a general commitment to minimize it without concrete measures (Government of Vietnam, 2020). The green agenda is similarly thin: most job-related measures remain abstract, as in the JETP Resource Mobilization Plan, the National Green Growth Action Plan, and the National Climate Change Strategy, with only sparse concrete loss mitigation, such as exemptions from ecosystem-service fees for struggling households (Government of Vietnam, 2022b).

The limited civic framing in green strategies rarely translates into concrete provisions: high-level and internationally oriented documents acknowledge vulnerabilities but seldom include measures to address them, while sectoral action plans prescribe mainly benefit-promoting measures through modernization and governmentality logics. In contrast, the digital transformation exhibits stronger internal coherence: the dominant digital modernization and governmentality frames align consistently with its distributive model of system expansion and benefit diffusion to generalized citizens, business actors, and technically skilled groups.

Another noteworthy feature is the prevalence of ambivalent measures that promise benefits or harm prevention but potentially impose new burdens. While interventions to promote biofuels, electric vehicles, digital identification, and centralized databases are framed as unequivocal public goods, they, in practice, expand government oversight and shift adjustment costs onto citizens. For instance, to meet the NDC target on E5 ethanol-blended fuel, the Ministry of Transport emphasizes awareness-raising to stimulate public demand (Ministry of Transport of Vietnam, 2024). Yet adoption remains limited due to perceived safety concerns, turning the policy into a psychological-behavioral challenge. Ambivalence is even more pronounced in the digital agenda. Measures that promote inclusion in digital systems and services simultaneously entail heightened surveillance and ideological conformity. For instance, access to one’s own personal data in the national population database is framed as a right, even as state agencies retain unrestricted access (National Assembly of Vietnam, 2024). This recurring narrative of “both rights and duties” (*quyền và nghĩa vụ*) can also be found in other documents. It reveals a paternalistic version of the capability-based approach, which confounds the improvement of personal capability to achieve freedoms with the enforced promotion of such freedoms as defined by the state (Claassen, 2014).

4.3. Symbolic Participation

Procedural justice is the least developed dimension: documents often invoke citizen involvement without specifying mechanisms or participants, and procedural provisions are absent entirely in nine of 26 green and seven of 21 digital documents.

Where procedural elements are included, both transformations rely primarily on informational access and disclosure (16 green and 12 digital documents). These are typically grouped with educational, awareness-raising, and capacity-training measures (Government of Vietnam, 2022a), suggesting they facilitate policy execution rather than democratic governance. Although nearly all binding documents formally undergo public consultation (Interviewee 9, 2025), the procedures are rarely detailed in policy texts. These consultations are often substantively thin, providing little information about survey content or how feedback influences final decisions. Several interviewees therefore characterize these processes as largely symbolic, with limited impact on the policy cycle (Interviewee 6, 2024; Interviewee 12, 2025). Therefore, the analysis codes only explicit references to consultation, social dialogue, or co-production mechanisms, which appear in four documents in each agenda. Some of these documents include strong participatory language, promoting, for example, the “co-creation of values” in public service delivery, yet without specifying concrete methods (Prime Minister of Vietnam, 2021b). Regarding access to legal process, monitoring, or complaint mechanisms appear in four green and three digital documents. However, they neither involve independent adjudication nor clarify avenues for redress or compensation, falling short of fairness standards identified by the scholarship (Walker & Day, 2012). Consequently, across the three procedural pillars introduced in Subsection 2.4.3, provision is heavily skewed toward the first: information disclosure is common, while participation in decision-making and access to legal process, which would let affected groups shape or contest policy, remain thin.

The participants in both transformations are constructed in generic, undifferentiated terms, typically as “the people” and “business actors,” with only limited specification of vulnerable groups in the green transformation. NGOs and civil society groups are underrepresented even in the green agenda, only appearing in the earliest and abstract strategies (Prime Minister of Vietnam, 2021a, 2022b). Both transformations thus employ an equality-based identification logic, framing due process as broad permission to engage with transformational activities rather than as improving the representation of marginalized groups.

Overall, procedural justice remains largely symbolic, with a generic, weakly defined participant base. This minimalism mirrors the broader justice patterns identified earlier: although the green transformation displays a somewhat greater sensitivity to vulnerability, participation rarely extends beyond information disclosure and consultation rhetoric. The digital transformation, meanwhile, equates fair process with giving citizens access to information provision and inclusion in pre-designed digital systems, prioritizing passive compliance over genuine social empowerment.

5. Discussion

This section explains the justice patterns in the two transformations, drawing on interview data and relevant literature.

5.1. *Policy Integration and Intersectionality*

The observed patterns of justice can be traced to persistent limitations in policy integration, which operate in three interrelated ways: limited coordination between Vietnam’s transformations, fragmented institutional responsibilities within the green transformation, and the securitization of the digital transformation.

The green and digital transformations show little meaningful horizontal coordination, particularly in the social dimension. Interviewees involved in policy drafting confirmed that core strategies for both transformations were developed simultaneously to support sustainable development, consistent with their closely aligned release dates (Interviewees 2 & 5, 2024). However, this aspiration has not translated into formal coordination. In the green transformation, high-level strategies and leadership statements only briefly acknowledge the desirability of linking the two transformational agendas (Pham Minh Chinh, 2025; Prime Minister of Vietnam, 2022d). A few sectoral plans connect greening and digitalization activities, without discussing their spillover to other social domains. These include, for example, the State Bank of Vietnam's (SBV) task of developing environmentally friendly high-tech payment methods to reduce the use of banknotes (SBV, 2023). Meanwhile, the digital transformation is almost entirely silent on environmental concerns. Notably, the National Strategy for Digital Economy and Society conceptualizes digital development as comprising the digital economy and digital society, two pillars of sustainable development, without reference to the environmental pillar (Prime Minister of Vietnam, 2022c).

This disconnection is not peculiar to Vietnam. Concurrent multisectoral strategies in closely related domains, sustainable development, climate mitigation, and adaptation, have developed with little connection to one another even in Western European countries with longer traditions of coordinated planning (Casado-Asensio & Steurer, 2013). In Vietnam, the disconnection extends to the operational level. Even when a strategy is cross-sectoral and involves multiple ministries, task execution remains sector-specific. Both the Green and Digital Transformations frequently assign social sustainability tasks to the Ministry of Labor, whose abolition in a bureaucratic reshuffle in early 2025 led to confusion over responsibilities for social welfare programs (Interviewee 11, 2025). Some officials reported that greening efforts in their sectors were deprioritized in favor of urgent digitalization tasks (Interviewee 9, 2025). Even within the SBV, a coordination-minded organization, departments responsible for green and digital initiatives still operate separately (Interviewee 15, 2026). The lack of operational linkage leaves no institutional basis for aligning justice objectives across the two.

Policy integration is also weak within the green transformation itself, and this internal fragmentation is structural rather than incidental. The bureaucratic politics scholarship holds that cross-cutting, jurisdiction-spanning problems like climate governance become sites of contestation over ownership among agencies defending their bureaucratic turf (Peters, 2018). Vietnam is no exception to this logic despite its one-party system. Although frequently portrayed as a centralized developmental state under firm Communist Party control, its administrative reality features multiple decision-making centers with overlapping competences (Ortmann, 2017). Its bureaucracy favors preserving institutional autonomy over efficiency, and relations between policy documents remain ambiguous, settled in practice by the relative authority of the agencies involved rather than clear legal ordering (Benedikter, 2016). The green transformation's justice provisions are formulated and implemented within this structure.

The consequences appear between national strategies and the sectoral action plans responding to them. National strategies, produced mainly by the Ministries of Planning and Investment and of Natural Resources and Environment and the Prime Minister's Office, articulate relatively balanced narratives combining growth with social considerations. These commitments are inconsistently carried into sectoral action plans because of how legal mandates are distributed: central authorities define objectives, but line ministries retain exclusive mandates and instruments for implementation, each reconciling any single strategy with multiple

cross-cutting agendas beyond the two transformations (Interviewee 9, 2025). Abstract equity requirements imposed from above are therefore hard to operationalize, the more so given limited guidance from coordinating ministries, and each ministry interprets them through its own professional lens and interests. The green-jobs provision illustrates the result: the Green Growth Action Plan (Prime Minister of Vietnam, 2022a) assigns responsibility for green jobs to the Ministry of Labor, yet even those involved in drafting the plan were uncertain about the concept, which had been included only under international pressure (Interviewee 6, 2024). Left to interpret such objectives independently, line ministries produced uneven, fragmented outcomes, not because of opposition to the commitments but because the institutional structure provides no mechanism through which a cross-cutting justice objective survives translation into sectoral plans intact.

Finally, the securitization of the digital transformation, combined with broader political constraints, restricts the recognition of intersecting vulnerabilities. Three reinforcing conditions produce this effect. First, most domains of the digital transformation fall under the oversight of the Ministry of Public Security, whose framing isolates digital fairness from other justice concerns. Second, this isolation goes largely unchallenged outside the security establishment, because policymakers broadly share an entrenched belief that development's benefits outweigh its disadvantages. Thus, the challenges facing low-income, elderly, and minority populations, from digital literacy to cyber-fraud exposure, are widely acknowledged informally yet rarely recognized in policy (Interviewees 14 & 15, 2026). Third, ethnic minority affairs are in particular treated as politically sensitive, and linking them to other development issues is typically avoided (Interviewee 12, 2025). Even well-intentioned social projects therefore refrain from naming target groups, recasting politically structured disadvantage as a technical matter of generic beneficiaries (Li, 2007)—a project supporting 500 households should not specify “500 Hmong families” (Interviewee 12, 2025). Only one measure across the digital agenda explicitly targets a named vulnerable group, through digital commerce skills training for ethnic minorities (Prime Minister of Vietnam, 2022c). The combined result is a failure of recognition—disadvantages that compound across group memberships are dissolved into generalized development challenges.

5.2. National Leaders and Influence on Policy Design

National leadership decisively shapes the overall justice orientation of Vietnam's green and digital transformations. Prime Minister Pham Minh Chinh and Party General Secretary To Lam are particularly influential in steering the green and digital transformations, respectively.

In the green transformation, the prime minister's personal leadership has been consequential, the more so after political turbulence saw all original deputy PMs of the 15th National Assembly replaced. Interviewees consistently identified the PM as the central political driver behind Vietnam's unexpected Net Zero-by-2050 commitment at COP26 and subsequent mobilization of the bureaucracy around climate and green growth objectives (Interviewees 4 & 7, 2024; Interviewees 9 & 13, 2025). The PM's early speeches, internationally-oriented statements, and national climate and green growth strategies frequently employed civic and people-centered language, emphasizing themes such as “no growth at all costs” and a “whole-of-society approach” (Pham Minh Chinh, 2021; Prime Minister of Vietnam, 2021a, 2022d).

The trajectory of this leadership, however, reveals the system's limits. The sudden escalation of mitigation ambition at COP26 caught the national bureaucracy by surprise, including the Environment Ministry itself (Interviewee 7, 2024). Furthermore, the justice rhetoric of the early speeches and strategies was closer to the civic, people-centered register typically advanced by NGOs and civil society groups rather than by government agencies (Di Gregorio et al., 2017), and the commitments it carried imposed tasks far removed from the bureaucracy's established professional repertoire. Combined with the integration problems documented in Subsection 5.1, the result was that early justice commitments exceeded administrative capacity and fragmented across the green policy mix.

In contrast, the digital transformation exhibits stronger top-down coherence under To Lam's leadership. Digitalization is embedded within broader institutional reforms and the "era of national rise" vision to make Vietnam a high-income country (Politburo of the Communist Party of Vietnam, 2024). Line ministry officials note that digitalization directives carry greater urgency than green ones, reinforcing internal alignment (Interviewee 9, 2025). This produces a consistent digital modernization and governmentality frame centered on economic growth, technological upscaling, and national security, across which the three justice dimensions are stably operationalized. Recognition prioritizes infrastructure access, digital skills, and innovation; distributive measures consistently benefit generalized citizens and business actors; and participation is symbolic and passive, with "the people" as adopters rather than makers of digital systems. Rather than proactively identifying vulnerabilities, inclusion is assumed to occur indirectly through a neoliberal logic of growth and service expansion (Interviewee 12, 2025; Interviewee 14, 2026).

5.3. International Dynamics: Reputation and Financing

Interviewees consistently identified international dynamics as a crucial factor shaping the uneven incorporation of vulnerability-oriented justice provisions in Vietnam's green transformation, and their near-absence in the digital transformation.

Justice provisions in Vietnam's green framework emerge from a bi-directional interaction between the state and international partners across reputational and material dimensions. Vietnam seeks recognition as a responsible member of the international community and a pioneer in sustainable development, leading to rhetorical alignment with global just transition norms. At the same time, international actors pressure Vietnam to incorporate equity, inclusion, and just transition principles as preconditions for partnership. This dynamic is most visible in early strategies and externally-facing documents, which closely mirror expectations of international partners (Government of Vietnam, 2023; Pham Minh Chinh, 2021; Prime Minister of Vietnam, 2022d).

Reputational incentives feed into financial design. Interviewees emphasized that the bureaucracy has deliberately made targeted distributive measures contingent on international financing, with quantifiable decarbonization targets in sectoral action plans functioning primarily as a benchmark for external financing needs under the Paris Agreement (Interviewees 9 & 10, 2025). Activities with significant social uplift potential are expected to rely on foreign support while less disruptive measures are financed domestically. For example, water-saving practices such as Alternate Wetting and Drying are state-funded only in well-equipped regions, with implementation in weaker areas contingent on foreign assistance (Ministry of Agriculture and Rural Development of Vietnam, 2023).

However, this emphasis weakens once policies move from strategic commitment to implementation. Members of the JETP consortium, including Global North governments, multilateral development banks, and United Nations agencies, actively promoted justice during negotiation of the Resource Mobilization Plan. Yet interview evidence indicates that equity concerns were rarely raised during subsequent discussions over grants and loans (Interviewees 1, 3, & 8, 2024). Justice provisions therefore appeared to function primarily as legitimating devices for Global North partners during agenda-setting but were deprioritized once negotiations shifted toward bankable projects (Interviewees 4 & 6, 2024). Similarly, foreign partners pressed for green jobs in the Green Growth Strategy over Vietnamese reservations. Once adopted, they offered little support to operationalize the concept in Vietnam's context (Interviewee 6, 2024). The cessation of external advocacy effectively removed both reputational and material incentives for Vietnamese authorities to operationalize vulnerability-mitigation commitments, as evidenced by their near disappearance in policy documents after 2023.

This international dynamic does not apply to Vietnam's digital transformation, which has been securitized and framed as a matter of national technological sovereignty rather than individual rights, leaving little space for meaningful external involvement (Huynh, 2024). This differs from how technological sovereignty is pursued in the EU, where the stated goal of reducing dependence on foreign technology has been undercut by investment directed at technology adoption rather than domestic production capacity, leaving that dependence largely intact (Gerbaudo & Haeusl, 2025). Vietnam's securitized variant, by contrast, achieves a measure of autonomy precisely by restricting external involvement in the digital domain. Unlike climate governance, it is not embedded in a dense international regime nor dependent on concessional financing. Consequently, international actors neither exert normative pressure to include justice commitments nor possess leverage to demand their implementation, and the data-localization efforts pushed by the Public Security Ministry foreclose external influence over justice provisions entirely.

5.4. Parallel Transformations, Converging Justice Outcomes

Together, the preceding subsections show that Vietnam's green and digital transformations, though they advance without coordination, arrive at strikingly similar justice patterns: both dilute recognition of specific vulnerabilities, distribute benefits to already-advantaged actors, and confine participation to passive or symbolic forms. Crucially, this similarity is produced not by any linkage between the agendas, which subsection 5.1 shows largely absent at both strategic and operational levels, but by structural conditions bearing on each separately. Each of the three factors examined operates in this way. Limited internal policy integration leaves justice commitments to fragment within the green transformation while securitization subordinates justice to political stability priorities within the digital transformation, with no mechanism aligning the two. National leadership sets the justice orientation of each agenda independently, overextending it in the green case and holding it to a stable managerial frame in the digital case. International dynamics likewise act on each separately, building and then withdrawing vulnerability-oriented provisions in the green agenda while being foreclosed by securitization in the digital one. The two transformations thus converge not because they are coordinated but because the same structural constraints, affecting each in isolation, push both toward equally thin justice provisions.

These findings substantiate the concept of parallel transformation proposed in Section 2: this is not a deficient or temporary form of the twin transformation model, but a distinct governance configuration for

concurrent transformations, in which shared structural conditions rather than coordination account for their convergent outcomes. Theoretically, the case speaks to a twin transformation scholarship that traces these justice limitations to the market-based conditions of the Global North liberal democracies on which it is built, and looks to departures from those conditions for their remedy (Paraná & Santaella-Gonçalves, 2026). That the same limitations also occur in Vietnam, a developmental one-party state, indicates that these conditions are not necessary for weak transformational justice, nor is their absence sufficient to prevent it.

6. Conclusions

This article has examined how justice is articulated in policies governing Vietnam's green and digital transformations. Across both agendas, the three justice dimensions follow similar structural patterns, though the green transformation is somewhat more vulnerability-sensitive than the digital transformation. The green agenda's early people-centered framing fades in later implementation plans toward the digital agenda's managerial-developmental pattern, with nominally welfare-enhancing measures across both imposing new adjustment burdens and participation remaining largely passive and symbolic.

These findings allow the article to make two academic contributions. Conceptually, the article proposes the concept of parallel transformation, in which two transformational agendas proceed without meaningful coordination, under shared institutional constraints, yet arrive at convergent justice patterns. Theoretically, the article shows that the presence of the market-based conditions of Global North liberal democracies is not the cause of weak transformational justice, nor their absence its cure—the same limitations the scholarship associates with those conditions also occur in Vietnam, their near-antipode.

The findings carry pragmatic relevance for transformational governance. The Vietnamese case suggests that pursuing ambitious cross-agenda synergies may be less feasible than often assumed (Diodato et al., 2023). Tightly integrating decarbonization and digitalization risks overstressing limited capacities in developing countries, potentially further diluting justice commitments. More modest coordination may be both more feasible and less likely to marginalize justice concerns, such as shared vulnerability assessments across the two agendas, common social safeguards for green and digital projects, and coordinated labor-market planning for transformation-affected groups. The analysis also highlights the significant leverage of international partners over justice standards, especially in the green domain. Global North governments, development institutions, and NGOs can therefore play a more constructive role by embedding equity requirements within financing agreements and policy partnerships across transformational processes in the Global South.

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ChatGPT is employed to fix spelling errors and improve writing flow. It is not used for generative purposes (i.e., finding references or formulating new arguments).

Supplementary Material

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

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