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Review

One and the Same or Worlds Apart? Linking Transformative Regional Resilience and Just Transitions Through Welfare State Policies

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Abstract: This paper explores the intersection between transformative resilience and just transitions, two increasingly significant frameworks in the context of environmental and socio-economic adaptation. Applying a systematic literature review, this paper examines how these concepts are defined and identifies both overlapping and non-overlapping dimensions within the existing literature. The analysis then shifts to consider the role of welfare state policies in reinforcing these connections. Specifically, this study assesses how physical social infrastructure, welfare state provisions, and eco-social policies are able to bridge the concepts of transformative resilience and just transitions. The findings indicate a notable gap in the literature connecting transformative resilience and just transition, despite the potential for aligning these concepts. This paper thus contributes to the theoretical foundation for discussing transformative resilience and just transitions together, underscoring the need for inclusive policies in sustainable development frameworks.

Keywords: just transition; transformative resilience; systematic literature review; welfare state; social policies; social infrastructure

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1. Introduction

In the face of rising environmental and socio-economic challenges, the need for adaptive and equitable approaches to transition has become critical [1–3]. As societies struggle with the impacts of climate change, economic restructuring, and social inequalities, the concepts of transformative regional resilience and just transition emerge as central frameworks for guiding sustainable development. In this context, transformative resilience refers to the ability of regions and individuals to anticipate, adapt to, and recover from various shocks and stresses while undergoing structural changes that promote long-term stability [4]. This approach emphasizes the importance of building local capacities and fostering adaptive governance, allowing regions to transform themselves in the face of uncertainty [5]. In contrast, the just transition framework highlights the importance of social equity in the processes of environmental and economic change, seeking to ensure that the burdens and benefits of these transitions are shared equally [6]. This framework is built on the principles of fairness, inclusivity, and empowerment, aiming to prevent the exacerbation of inequalities during transition processes [7].

While both frameworks provide essential perspectives on sustainable development and socio-economic transformation, they differ in their focus and application. Resilience frameworks often center on the mechanisms through which regions adapt and transform, sometimes overlooking the social justice implications of these transitions [8]. Conversely, just transition approaches prioritize equity and justice, which can lead to challenges in addressing the broader systemic and adaptive capacities required for long-term resilience [9]. Despite these differences, there are notable commonalities, including a shared emphasis on the importance of participatory governance, local knowledge, and community engagement in achieving sustainable outcomes [10,11]. In this regard, both frameworks underscore the need for strategies that empower local communities and ensure that they are not merely passive actors affected by change but active participants in shaping transitions [12]. Given the wide range of policy strategies aimed at enhancing regional resilience and facilitating economic transitions, identifying effective solutions is essential. This paper focuses on the role of the welfare state, specifically examining three key dimensions: physical social infrastructure (e.g., community centers), welfare state provisions (e.g., transfers, education, healthcare), and eco-social policies (e.g., decommodification of labor, work-time reduction). The welfare state can play a crucial role in ensuring equitable access to resources and, hence, enabling individuals to withstand and adapt to economic and environmental changes. By addressing both immediate needs and long-term structural changes, welfare state policies create a foundation for resilience, while also promoting social justice and fairness, key components of a just transition. This dual function of the welfare state helps integrate the local, place-based focus of transformative resilience with the people-centered approach of just transition, fostering inclusive and sustainable development.

In summary, this paper seeks to address the following research questions:

(1) What are the key similarities and differences between transformative resilience and just transition, and what are the potential benefits and challenges of integrating them?
(2) How can welfare state policies help bridge the gaps and align the synergies between transformative resilience and just transition?

To date, the concepts of transformative resilience and just transition have not been linked, leaving their interactions and the potential to strengthen these interconnections unclear. The goal of this paper is thus to show that combining transformative resilience and just transition provides a broader perspective, enabling more comprehensive approaches during times of change. Relying solely on a single framework when designing policies and future pathways may overlook critical elements necessary for a successful transition. The integration of both concepts hence fosters a more holistic and nuanced perspective, combining local, place-based solutions that emphasize region-specific resilience with people-centered approaches that prioritize equity and fairness. By bridging these two frameworks, policymakers can design transitions that not only address the unique needs of regions but also ensure that social justice considerations are central to the process. This alignment can enhance policy coherence by harmonizing adaptive strategies with equity goals. Furthermore, integrating transformative resilience and just transition ensures that policies are equipped to tackle immediate social vulnerabilities, such as economic disparities and resource inequities, while simultaneously preparing for long-term challenges like climate adaptation and systemic transformation. The dual focus of this approach enables a balanced response to crises, fostering transitions that are sustainable and equitable in the face of future uncertainties.

Despite their complementary nature, the two frameworks have been studied in isolation, leading to a gap in understanding how their strengths can be integrated to produce holistic and effective strategies for adaptation and transformation. To this end, this paper utilizes a systematic literature review to identify and analyze the unique qualities, overlapping dimensions, and critiques of each framework. A systematic literature review enables a comprehensive overview of all relevant research, ensuring that the core themes of both transformative resilience and just transition are fully captured. This approach is crucial for subsequent analysis using a Biterm Topic Model (BTM), as it allows for a nuanced exploration of the themes and connections across the literature. By synthesizing all available studies, this review provides a foundation for identifying whether and how the two concepts overlap, offering insights into areas of convergence and divergence.

The remainder of this paper is structured as follows. Section 2 offers a brief overview of the methodology, followed by a discussion of the key definitions, approaches, and critiques of the two frameworks in Sections 3 and 4. In Section 5, the main commonalities and differences between the two concepts are presented. Section 6 explores the potential role of the welfare state in connecting transformative resilience and just transition, followed by the conclusion in Section 7.

2. Materials and Methods

To gain an initial understanding of the core dimensions and challenges within transformative resilience and just transition, a systematic literature review was conducted. This review aims to assess the volume of existing research on each concept and to identify any explicit areas of overlap between them. A systematic literature review is a valuable method for synthesizing existing research, as it provides a comprehensive and structured approach to assess the volume, scope, and quality of the literature on a given topic [13]. Methodologically, it facilitates the identification of key themes, trends, and gaps within the literature while also ensuring consistency and reliability in the analysis [14]. By systematically reviewing and analyzing the existing body of work, the review ensures that all relevant studies are considered, minimizing bias and providing a rounded overview of the state of research [15].

This literature review was conducted using two major databases: Scopus and Web of Science. The review focuses on two primary concepts: transformative resilience and just transition. For the concept of just transition, the term "just transition" was used in searches within titles, abstracts, and keywords. Given that transformative resilience is comparatively less developed conceptually than just transition, the search terms used were "transformative" OR "evolutionary" AND "resilience" within titles, abstracts, and keywords. The separation of "transformative"/"evolutionary" and "resilience" in the search terms aimed to capture a comprehensive range of studies, given the conceptual underdevelopment of transformative resilience. This approach sought to include works that, while not explicitly using the term "transformative resilience", might still contribute to the concept's theoretical or practical understanding. While this strategy may have introduced papers that did not primarily focus on transformative resilience, these were systematically filtered through prior defined exclusion criteria. For instance, studies were excluded if they centered solely on natural or environmental resilience without addressing regional or transformative aspects. The inclusion of "evolutionary resilience" was intended to provide a broader perspective, as it is frequently used interchangeably with transformative resilience.

The searches were filtered to include papers in English within relevant fields related to regional science (social sciences, geography, environmental science, urban studies, economics), with no restrictions on publication date. Papers that focused solely on technical or engineering solutions without addressing the societal, regional, or systemic aspects of transformative resilience and just transition were excluded. Additionally, studies were excluded if they only superficially mentioned the terms "transformative resilience" or "just transition" without offering substantial theoretical or empirical contributions to these concepts. Furthermore, any studies with inaccessible full texts were excluded.

Figure 1 presents an overview of the literature review's findings. The initial search on transformative resilience yielded more studies. However, the number of included papers on this concept was significantly lower compared to those on just transition. This discrepancy arose because the initial search for transformative resilience was broader, but many of the identified papers focused primarily on natural or environmental science-related aspects of resilience or did not meaningfully address transformative resilience within the texts. Only one paper included in this review appeared in both searches, highlighting a clear gap in studies explicitly addressing both concepts together. The following sections explore the unique aspects and shared elements of each framework, leading to a discussion on how they can be effectively integrated through welfare state policies.

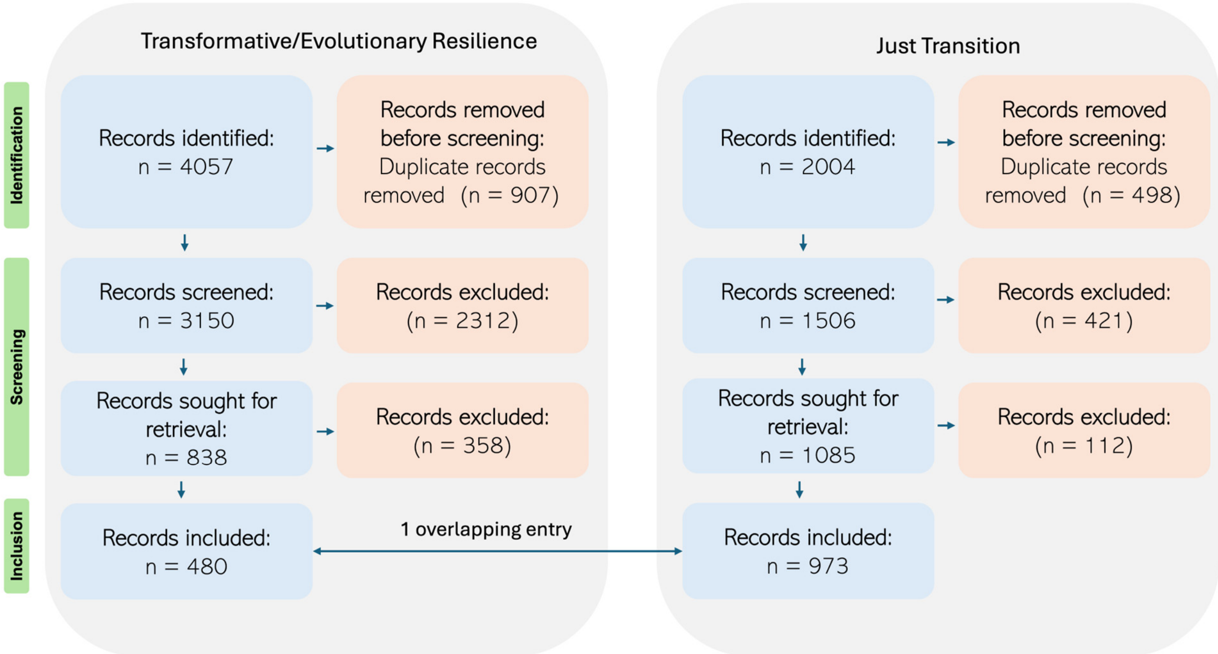

Figure 1. Results of the literature search.

To systematically analyze the collected literature, topic modeling using the Biterm Topic Model (BTM) was applied. This approach reveals frequently co-occurring keywords and phrases, offering insights into dominant themes and connections across the texts. By capturing these co-occurrences, BTM establishes a framework for independently conceptualizing and defining the two central concepts. BTM findings also facilitate the identification of overlapping themes, highlighting areas of convergence between these two concepts.

3. Regional Resilience: An Old Concept Revitalized

Regional resilience has become a fundamental concept in understanding how regions adapt to, recover from, and potentially transform after experiencing economic, environmental, or social shocks [16]. The literature on regional resilience has grown significantly over the last few decades, especially as globalization and climate change have exposed regions to an increased frequency of disruptions [17]. To provide context for synthesizing key studies on transformative resilience, a brief overview of the term's origins is presented, illustrating how its more transformative aspects have evolved over time.

3.1. The Origins of (Regional) Resilience

The concept of resilience originated in ecology and systems theory, where it was initially used to describe the ability of natural systems to absorb disturbances and reorganize while undergoing change [18]. This idea has since been adapted to regional studies, particularly in urban and economic geography, where it refers to a region's capacity to withstand, adapt to, and recover from shocks. While definitions vary, regional resilience generally includes elements of robustness, adaptability, and/or transformability in the face of various types of disturbances (economic downturns, natural disasters, pandemics, etc.) [18].

Scholars have proposed several frameworks to interpret and advance the concept of regional resilience. Early definitions of resilience, particularly those rooted in engineering and materials science, emphasize the capacity of a system to resist sudden, acute shocks and return to a pre-disturbance state, often conceptualized as a stable equilibrium. This approach, known as "engineering resilience", was designed for systems that function in relatively stable and predictable environments and assume a single, stable equilibrium point to which a system will naturally return after a disturbance [19,20]. Thus, engineering resilience primarily addresses immediate, one-time disruptions and a quick recovery rather than gradual changes [21,22]. It has been applied to many contexts where the goal is to measure the speed and efficiency with which a system "bounces back" to its prior state after a temporary shock [20].

In contrast, "ecological resilience" expands the focus to encompass complex adaptive systems which may experience multiple equilibrium states. This concept, introduced by Holling in the 1970s, addresses a system's capacity not only to recover but to absorb disturbances in a way that may alter the system's structure without leading to collapse [20]. Ecological resilience allows for both gradual and abrupt changes and emphasizes the system's ability to adapt to ongoing environmental fluctuations, making it particularly relevant in fields like environmental management and social–ecological systems [18,23]. Unlike engineering resilience, which is mostly focused on sudden shocks, ecological resilience accounts for both types of disturbances, recognizing that disturbances can cumulatively lead to shifts that are not reversible or are only semi-stable [24].

3.2. Resilience as a Transformative Process

As the understanding of resilience has evolved, scholars have increasingly argued that resilience is not merely about recovery but involves a transformative capacity. The concept of transformative resilience was initially referred to as evolutionary resilience in the late 1990s. However, it only gained prominence around 2010, when it was defined as a framework referring to the "[. . .] ability of the region's industrial, technological, labor force and institutional structures to adapt to the changing competitive, technological and market pressures and opportunities that confront its firms and workforce" [15] (p. 30). Figure 2 presents the results from the BRM for transformative resilience, which comprises five distinct clusters, including transformation and change, economic resilience, environmental resilience, social resilience, adaptation and flexibility, and governance and policy. Figure 2 illustrates the relationship between the key terms and main topics within the literature. Thereby, it provides a visual representation of how frequently specific words are associated within each topic. The words linked to each topic are statistically derived based on their co-occurrence, ensuring that their inclusion is grounded in the content of the literature. Thicker lines denote stronger associations between words, while larger words indicate higher relevance or frequency within a topic. Topic names were assigned manually to provide a clear overview and facilitate interpretation.

Regarding transformation and change, the literature stresses that, rather than aiming to return to a pre-shock state, the focus of transformative resilience shifted towards "bouncing forward", adapting, innovating, and evolving in response to disruptions [25,26]. Traditional resilience approaches, like engineering resilience, operate on the assumption that a system can return to a single, stable equilibrium after a shock. However, many more recent shocks, such as the effects of climate change, economic globalization, and technological disruptions, are not only irreversible but can also permanently alter the conditions under which regions operate [27]. Transformative resilience acknowledges that returning to a previous state may be neither possible nor desirable, especially if the previous state was vulnerable or unsustainable [28,29].

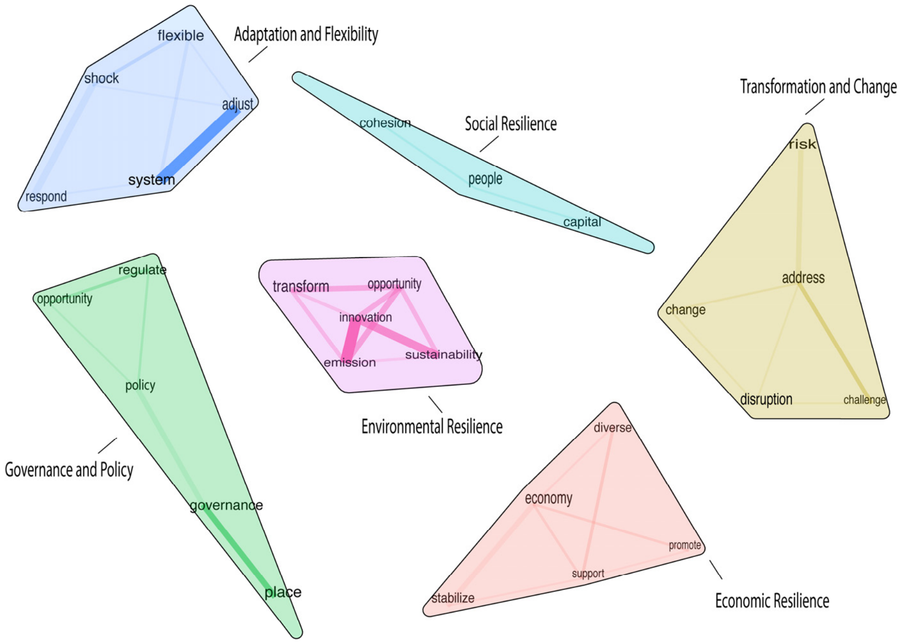

Figure 2. Topic analysis: transformative resilience.

Second, regions are viewed as systems capable of continuous learning, making adaptation and flexibility important themes in the literature. Unlike engineering resilience, which is often framed as a one-time recovery, transformative resilience emphasizes continuous adaptation. Transformative resilience challenges the "bounce-back" mentality by encouraging regions to "bounce forward" [25]. This concept is particularly valuable in response to complex, multi-dimensional crises that reveal systemic weaknesses, such as financial recessions, which can expose inequalities and dependencies across multiple systems. In this regard, "bouncing forward" implies not only adapting to new conditions but using crises as opportunities for positive transformation [30]. Hence, resilient regions are those that do not just recover but change in ways that make them better prepared for future challenges [31]. Regions must be flexible and capable of responding to both slow and abrupt changes [5,28]. Transformative resilience sees adaptation as an ongoing process of learning and adjusting rather than a one-time response to single shocks [32]. This adaptability is essential in complex systems where incremental changes can accumulate, requiring systemic shifts in policy, industry, or social structures [33,34]. Accordingly, Li et al. [35] show in their case study that regional economic resilience relies on the capacity to withstand gradual, accumulating disruptions while simultaneously enhancing a region's ability to renew existing economic pathways or develop new ones. This also involves integrating new technologies, shifting to more sustainable practices, and strengthening trans-regional cooperation [4].

Third, in transformative resilience, regions are encouraged to innovate as a response to crises, using disruption as an opportunity to implement more efficient or sustainable practices [36]. In this context, environmental resilience emerges as a central theme in the literature, emphasizing innovations that promote environmental adaptation. Transformative resilience highlights that regions can actively shape their futures by adopting innovative responses rather than relying on recovery alone [37]. For instance, the shift from traditional manufacturing to technology-based industries or green infrastructure represents adaptive growth pathways that support both resilience and long-term sustainability. In this context, it is argued that in times of disruption, innovation serves as a critical mechanism through which regions reinvent themselves, responding to immediate challenges while simultaneously restructuring to better anticipate and withstand future stresses [38]. This aspect of transformative resilience emphasizes adaptability and proactive policymaking in response to environmental challenges, allowing regions to seize opportunities for development in times of change. Additionally, there is a need to not only ensure flexibility within the innovation system but also to implement adaptive planning processes that incorporate responsive, open governance structures and dynamic frameworks for change [34,39]. For example, a case study on public service provision in China during the COVID-19 pandemic highlights that the shift toward digital platforms not only enhanced the efficiency of services during the crisis but also promoted opportunities for long-term resilience [37].

Fourth, transformative resilience involves rethinking a region's developmental trajectory, thereby fostering the creation of economic resilience. Transformative resilience promotes diversification as a buffer against economic vulnerability. By expanding into new sectors and building more diversified economies, regions become better equipped to absorb shocks and adjust to changing demands, enhancing long-term stability and adaptation [40]. Besides diversification, transformative resilience also supports the development of completely new growth paths [41]. Rather than striving to replicate past economic structures or social conditions, regions may take on entirely new growth paths, driven by shifts in industries, labor markets, and local governance [38,42]. Such reinvention helps to establish resilience as an ongoing, dynamic capacity rather than a one-time response to crisis.

Fifth, transformative resilience is focused on underlying vulnerabilities within a system. Rather than solely centering on the resilience of physical infrastructure or economic resources, it also considers social and institutional resilience, including the flexibility of governance structures and the inclusivity of policies [43,44]. For instance, during the COVID-19 pandemic, it was suggested that a transformation-oriented approach is critical for effective recovery. This perspective highlights the importance of strengthening local systems and infrastructures, including healthcare and labor policies centered on societal needs, as critical components for both immediate crisis response and long-term adaptation [45–47]. It is also emphasized that the political sphere, often primarily dominated by established actors, needs to be opened up to effectively address the needs of society [48,49]. Therefore, an approach that extends beyond these dominant actors, emphasizing a place-based and inclusive perspective, is essential for strengthening the transformative dimensions of resilience [50–52].

3.3. Critiques and Challenges of Transformative Resilience

While the concept of transformative resilience is influential in both academic and policy domains, several critiques have emerged regarding its operationalization, inclusivity, and effectiveness. One of the primary critiques of transformative resilience is its conceptual ambiguity. The term transformative resilience lacks a universally accepted definition, leading to varied interpretations and potentially inconsistent policy applications [53]. Scholars argue that this broadness can reduce its effectiveness by making it challenging to establish measurable outcomes or benchmarks, which are essential for assessing the success or failure of resilience-building initiatives [54,55]. As a result, transformative resilience risks becoming a "catch-all" phrase that lacks the specificity required for actionable planning and evaluation [4,12].

Critics also highlight that transformative resilience often overemphasizes stability and recovery, potentially at the expense of deeper, structural transformations [56,57]. In some cases, a more traditional resilience discourse is used to reinforce the status quo, particularly when efficiency and stability are prioritized over long-term change. This "bounce back" mentality can undermine the transformative potential by favoring policies targeting recovery rather than addressing the underlying causes of vulnerability, such as economic dependency on declining industries [4]. Transformative resilience policies may thus maintain existing vulnerabilities if transformative change is sidelined in favor of maintaining the status-quo or "returning to normal" rather than transforming regional structures [58,59].

In this regard, the transformative resilience framework also faces critique for insufficiently addressing power dynamics and social inequalities [60,61]. Scholars argue that without acknowledging and addressing these inequalities, resilience-building efforts may exacerbate existing divides, especially if wealthier or more politically connected regions are better positioned to implement these frameworks effectively [62,63]. This critique is particularly relevant for marginalized or peripheral regions that do not have equal access to the decision-making processes and resources required for resilience planning [64]. Hence, it is argued that transformative resilience approaches must recognize the localized nature of resilience, implementing strategies that consider specific spatial contexts and engage with processes across multiple scales [65,66]. In this respect, Voghera [67] provides a positive example of how an open governance and learning process approach to river basin management through the River Agreement in various countries can not only increase the resilience of a region in the face of climate change but also find the balance between top-down and bottom-up initiatives.

Last, it is argued that the transformative resilience framework often aligns with neoliberal policies, prioritizing market-based solutions and individual responsibility over collective action [68,69]. This neoliberal framing can shift the burden of resilience to individuals or local governments, overlooking the role of larger structural and systemic factors, such as national policy [70,71]. By relying on market-driven solutions, regional resilience efforts may promote short-term adaptation over long-term, systemic change, failing to challenge the economic and social structures that contribute to regional vulnerabilities in the first place [72].

4. Just Transition: From Workers' Rights to Social Justice for All

Compared to the literature on transformative resilience, the concept of just transition is more developed, although still relatively recent. Since its initial introduction, it has gained significant attention, particularly within the labor movement, and has since been widely adopted and adapted. This section outlines the core dimensions of just transition, tracing its origins within the labor movement and its evolution towards a broader focus on social justice issues.

4.1. Defining Just Transition

To identify the core themes in the literature on just transition, a BRM is employed, as in the previous section. Figure 3 shows the results of the BTM and highlights the five main topics commonly found in the just transition literature: labor and employment, environmental adaptation, sustainable transition, justice and redistribution, and climate policy. The origins of the just transition concept lie in the labor and environmental justice movements of the late 20th century [73], particularly within labor unions concerned about the adverse effects of environmental policies on employment [74]. Consequently, labor and employment emerge as prominent topics in the literature. The concept of a just transition, therefore, prioritizes safeguarding workers impacted by the shift away from fossil fuels and carbon-intensive industries. Its overarching aim is to create a regenerative economy that is environmentally and economically sustainable and socially equitable [75].

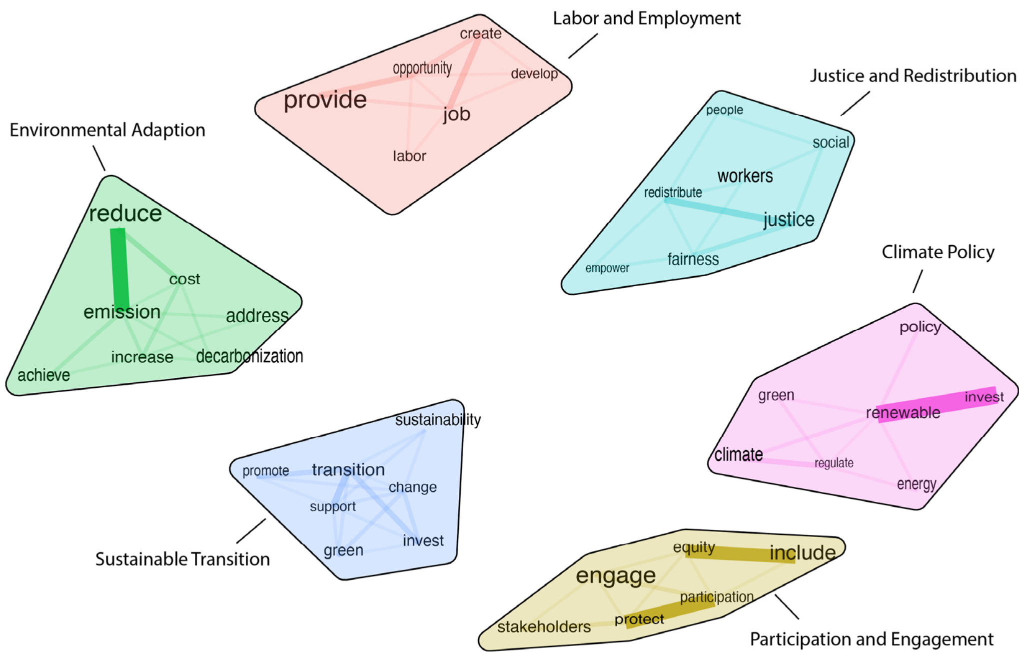

Figure 3. Topic analysis: just transition.

The Just Transition Alliance, founded in the 1990s, was among the first organizations to advocate for policies that protect workers and communities affected by environmental changes [7,76]. At its core, the just transition movement recognizes that while the transition to a greener economy is necessary to combat climate change, it can also lead to significant economic and social disruptions, particularly for workers and communities dependent on carbon-intensive industries. The just transition approach aims to mitigate these negative impacts while maximizing the benefits of environmental action, making climate policy, environmental adaptation, and sustainable transition central themes within the concept of just transition. In recent years, just transition has become a core element of climate policies at both national and international levels [77], being explicitly incorporated into the Paris Agreement, which calls for a just transition of the workforce to address the social implications of climate policies [78].

Another central topic to just transition is justice and redistribution. Accordingly, the concept of just transition has broadened over time, evolving from labor-centric issues to encompass a range of social justice concerns [79,80]. Researchers increasingly emphasize the need for systemic change that addresses inequalities beyond employment [81,82], focusing on issues such as equitable access to resources, environmental justice, and the inclusion of marginalized voices in decision-making processes [83]. Consequently, several recurring themes characterize the academic discourse on just transition. A central focus of the just transition literature is distributive justice, or the fair distribution of the costs and benefits associated with transitioning to a sustainable economy [84]. This includes ensuring that the burdens of job losses [85], energy price changes [86], and economic restructuring [87] do not disproportionately impact lower-income or marginalized groups. In recent years, a variety of frameworks have been proposed to operationalize just transition principles within climate and energy policies. One example is the idea of a Green New Deal, which calls for large-scale investment in renewable energy and green jobs while ensuring social protections for displaced workers [88]. Drawing on the historical example of the New Deal, which combined economic recovery with social welfare in response to the Great Depression, the Green New Deal emphasizes the importance of ambitious climate action alongside social equity [89]. In this context, policies that focus on communities are traditionally reliant on fossil fuel industries have been proposed [90]. Specifically, retraining programs, infrastructure investments, and the promotion of diverse industries, such as renewables or technology, are frequently discussed as strategies to ease transitions for society [91–93].

Other core themes within the concept of just transition include participation and engagement. In this regard, procedural justice, which emphasizes inclusive, transparent, and participatory decision-making processes, is a key concept in the literature [94]. This dimension of just transition emphasizes the importance of giving affected stakeholders, such as workers and local communities, a voice in the policymaking processes that shape the transition. Research highlights that participation is crucial not only for fairness but also for ensuring the long-term success and legitimacy of climate policies [95,96]. Additionally, fostering trust through transparent processes is vital as it enhances cooperation and collective action, which are vital for achieving sustainable outcomes [97,98]. In this context, studies suggest that long-term success depends on community-specific interventions rather than one-size-fits-all policies [99]. In this regard, scholars increasingly advocate for community-led approaches that empower local populations to lead and manage their own resources. A key example is sustainable energy, where an "energy democracy" approach empowers communities to take greater control over energy sources and pricing [100,101]. Such community-owned solar or wind projects show how this model can generate economic benefits while fostering a sense of local empowerment [102,103]. Moreover, recognition justice extends the scope of just transition by advocating for the acknowledgment and empowerment of marginalized groups who may lack representation in traditional decision-making forums [104]. This includes recognizing the unique social, cultural, and economic contexts of communities affected by climate policies and providing tailored solutions that respect local knowledge and values [105,106].

4.2. Critiques and Challenges of Just Transition

While just transition is widely supported, scholars highlight notable challenges in its implementation. One key critique is that just transition frameworks often remain broad and under-defined [107,108], which can lead to vague policies that lack measurable outcomes or specific commitments [109]. Additionally, there is concern that just transition policies may face resistance from stakeholders in carbon-intensive industries, creating political obstacles to their effective implementation [110,111]. In this regard, it is argued that the just transition discourse can be co-opted by powerful actors to promote incremental rather than transformational change [112]. For example, creating green jobs within a neoliberal economic model might fail to address broader issues of inequality and exclusion if it does not fundamentally challenge existing power structures [113,114]. A study examining South Africa and East Asia illustrates that entrenched power structures and weakened state capacities impede fundamental changes within the political system, thereby hampering the necessary changes required for a just transition [115]. It is similarly noted that just transition policies remain predominantly top-down and are characterized by conventional, market-oriented solutions, rather than fostering a more inclusive and open policy framework [116,117]. For example, a case study on the transition of a coal region in Australia demonstrates that, despite collaboration among multiple stakeholders, a lack of deeper interaction and cooperation has limited the effectiveness of just transition policies [118]. To address this, there is a growing call for transformative justice approaches that link just transition with broader social justice objectives, including anti-capitalist and anti-colonial frameworks [119].

A further critique of the just transition framework centers on temporal and generational inequities, which often receive insufficient attention in planning and policy formulation [120,121]. Just transition research traditionally emphasizes the immediate and short-term impacts of transitioning to low-carbon economies, focusing primarily on current workers and groups directly affected by economic shifts [122]. However, this approach can overlook the longer-term and intergenerational implications of the transition, potentially leading to policies that favor current stakeholders at the expense of future generations [123].

Another prominent critique of just transition policies is that they frequently fall short in adequately redistributing and compensating resources to the most vulnerable populations and those most affected by economic restructuring [124]. It is argued that these policies often emphasize job security measures, retraining programs, and environmental strategies while insufficiently integrating social protection mechanisms to ensure comprehensive support for affected groups [125]. This is, for example, emphasized by a case study on the transition from coal mining in South Africa and India, which highlights the need for governments to focus more on a comprehensive, socially oriented transition that protects the most vulnerable groups [126].

Similarly, it is emphasized that just transition policies often fail to adopt a systemic approach to transition. This means that these policies frequently focus on a limited perspective, such as a single sector, despite the fact that climate change affects multiple systems and populations [107]. A more comprehensive approach must consider the interconnected impacts of climate change across various sectors, including energy, agriculture, and infrastructure, addressing the diverse needs of affected communities.

5. Comparing Transformative Regional Resilience and Just Transition: More of the Same?

The previous section outlines the key themes, critiques, and challenges of transformative resilience and just transition through a systematic literature review. Through topic modeling, dominant themes are revealed, helping to pinpoint areas of overlap as well as differences between the two concepts. While only one paper appeared in both searches, the topic modeling highlights several potential overlaps, as well as divergences, which are discussed in this section.

The concepts of transformative regional resilience and just transition are widely applied in the discourse on sustainable development, particularly in the context of responding to climate change and socio-economic transitions. Both frameworks seek to foster systems that are responsive, equitable, and capable of withstanding environmental, economic, and social challenges. However, the two concepts arise from different traditions and focus on distinct, though sometimes overlapping, dimensions of change. Figure 4 displays the 50 most frequently used keywords in the just transition and transformative resilience literature. Twenty-two key words were identified as overlapping, highlighting the frequent occurrence of terms such as “climate”, “sustainability”, and “community” across both concepts. Based on these key words, Table 1 summarizes the main dimensions of each concept and highlights their commonalities.

Transformative resilience and just transition share several key characteristics, especially their emphasis on systemic change and addressing socio-economic and environmental challenges. Both frameworks advocate for deep, structural shifts rather than incremental adjustments. Transformative resilience seeks to enhance adaptability and reduce vulnerability by reconfiguring social, economic, and environmental systems in response to shocks and disruptions [127], while just transition aims to ensure that the shift to a low-carbon economy does not exacerbate existing inequalities but actively mitigates them through equitable redistribution and inclusion [109,123]. Both approaches stress the importance of equity and inclusivity, with transformative resilience focusing on addressing underlying vulnerabilities to build broader regional resilience [128,129] and just transition focusing on protecting vulnerable workers and communities during the transition [130]. Additionally, both frameworks recognize the need for long-term, adaptive capacity in governance, advocating for adaptable and flexible policies that can address unforeseen challenges [7,131]. Multi-level governance is another commonality, as both approaches emphasize the need for coordination across local, national, and international levels to ensure cohesion and effectiveness in policy implementation [132–135]. Despite these shared elements, both concepts face critiques for their reliance on neoliberal frameworks, top-down decision-making, and failure to fully address deeper structural inequalities, such as wealth and power imbalances [60,68,116,124].

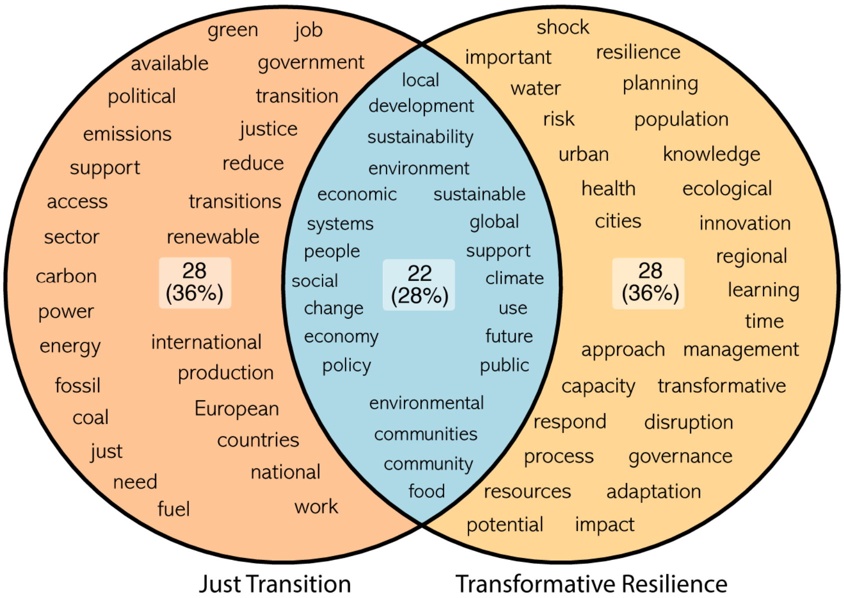

Figure 4. Overlapping and non-overlapping key words.

Table 1. Dimensions of transformative resilience and just transition and their commonalities.

Aspect	Transformative Resilience	Just Transition	Commonalities
Goals	Recovery, adaptation, and transformation to achieve long-term stability in response to shocks	Social equity, justice, and inclusivity in addressing changing economic and environmental structures	Striving for sustainable development
Theoretical foundations	Built on ecological and systems theory	Rooted in social justice and labor rights movements	Both frameworks draw from diverse interdisciplinary fields
Key principles	Adaptability, structural change, local capacity building after crises	Justice, equity, protection of vulnerable groups	Emphasis on local participation and governance
Timeframe	Short- and long-term adaptation and transformation	Immediate and long-term justice in transitions	Recognition of both immediate needs and long-term goals
Stakeholder engagement	Involves local stakeholders in planning and decision-making	Prioritizes the voices of affected workers and communities	Advocacy for open and participatory governance
Policy focus	Focuses on the impacts of economic, environmental, and social stresses on regions (and their economy)	Specifically focuses on the effects of the economic transition on workers and marginalized groups	Acknowledgement of vulnerabilities
Policy examples	Economic diversification, innovation, multi-system policy responses	Retraining programs, just transition funds, social protection programs	Acknowledging the integration of social, economic, and environmental aspects in policymaking
Potential challenges	Frequently relies on traditional resilience approaches, overlooking critical dimensions of equity and inclusion	Overlooks the diverse dimensions of justice, prioritizing environmental or short-term policy goals	Neoliberal policy traditions, top-down decision-making, lack of deeper redistribution

While transformative resilience and just transition share broad aims, their fundamental differences lie in their origins, focus, and implementation strategies. First, their theoretical foundations are distinct. Transformative resilience is based on ecological and systems theories, drawing from environmental sciences and physics to understand the capacity of systems to withstand and adapt to shocks. It is primarily concerned with how regions can adapt to ongoing challenges by reshaping their systems to be more resilient [18–20].

Just transition, however, originates in labor and environmental justice movements and is rooted in social and economic justice theories. It emerged from concerns that workers and communities dependent on carbon-intensive industries would bear disproportionate burdens in the transition to a low-carbon economy [6,117]. As such, just transition focuses more explicitly on addressing labor rights, social justice, and equity, with an emphasis on redistributing resources to those impacted by the transition [7,136].

The two concepts also diverge in their approach to economic change. Transformative resilience focuses on enhancing the adaptability of existing socio-economic systems. It advocates for innovation and diversification within current industries, with a focus on fostering flexibility in local governance and economic structures to prepare for future shocks [58]. The goal is not to replace the existing economic system but to ensure it can better absorb and adapt to challenges and change structures where necessary [4]. Just transition, in contrast, advocates for more radical economic transformation, challenging the dominance of neoliberal models. It calls for systemic changes that prioritize social and environmental justice, such as creating new, sustainable jobs in green sectors and ensuring that the benefits of these new industries are equitably distributed [85,91]. Consequently, just transition emphasizes the redistribution of wealth and resources to vulnerable populations, particularly workers in carbon-intensive industries [7,137].

Finally, while transformative resilience addresses vulnerabilities at a systems level, it does not always engage directly with power structures within those systems. It focuses on making systems more adaptable but does not necessarily consider who benefits from resilience-building efforts [61]. In contrast, just transition is more focused on addressing power imbalances within society. It explicitly targets marginalized groups and aims to correct socio-economic disparities, including ensuring that vulnerable communities and workers are not left behind in the transition process [138,139]. This more people-centered focus makes just transition more explicitly concerned with fairness and justice, while transformative resilience can sometimes overlook these issues in favor of broader, structural changes [140].

Table 1 highlights significant overlaps between transformative resilience and just transition approaches, particularly their shared emphasis on sustainable development, local participation and governance, and the integration of economic, social, and environmental objectives. These shared elements underscore that combining both concepts can provide substantial benefits for addressing current challenges. Transformative resilience brings a focus on systemic adaptability and long-term structural changes, ensuring that regions are better equipped to navigate future uncertainties. Just transition complements this by embedding social equity into the process, ensuring that no group is left behind during transitions. Together, these frameworks address the dual needs of preparing for systemic change and safeguarding social justice, which are often treated as separate priorities. For example, resilience initiatives that incorporate justice concerns can ensure that vulnerable populations are actively supported, while justice-focused policies that integrate resilience principles can ensure long-term stability and sustainability. However, integrating these frameworks also presents challenges, including reconciling their differing priorities and approaches. While transformative resilience often emphasizes long-term adaptive capacities and systemic change, just transition is rooted in addressing immediate social equity concerns and mitigating injustices during transitions. Balancing these temporal and thematic priorities requires a nuanced approach that neither neglects short-term needs nor compromises long-term sustainability. Additionally, aligning the two frameworks demands governance mechanisms that are capable of managing complexity and fostering collaboration among diverse stakeholders. Addressing these challenges is essential to ensure that policies are both inclusive and effective.

The next section explores the role of welfare state policies in bridging transformative resilience and just transition. This section provides a generalized overview of the role of the welfare state, thereby offering initial insights that could serve as a foundation for more context-specific analyses in future empirical studies. The goal is to provide a foundational starting point, acknowledging that future research will need to elaborate on these ideas within specific regional and national contexts.

6. The Role of Social Infrastructure, the Welfare State, and Social Policies in Bridging Transformative Regional Resilience and Just Transition

The previous section outlines key similarities and differences between resilience and just transition frameworks. Transformative resilience, rooted in place-based adaptation to shocks, contrasts with the justice-oriented, people-centered focus of just transition. Combining these concepts may therefore strengthen equitable transitions and regional resilience by integrating both place-based and people-centered approaches to policymaking. However, both concepts have been criticized for similar aspects, particularly regarding their insufficient attention to redistribution, fairness, and equality. This section, thus, aims to examine how investments in physical social infrastructure, welfare state provisions, and eco-social policies can integrate the strengths of transformative resilience and just transition, creating a more holistic framework for addressing sustainability and equity in the face of climate and economic transitions.

6.1. Physical Social Infrastructure as a Foundation for Adaptive and Equitable Transitions

Physical spaces to meet have been recognized as vital for societies [141]. Physical social infrastructure includes essential community assets like libraries, parks, community centers, cultural institutions, and local gathering spaces. These spaces play a crucial role in fostering social cohesion, trust, and collective identity, which are critical for communities to adapt to social and environmental changes [142,143]. Social infrastructure is fundamental for fostering a cohesive communities by creating environments where individuals can interact, collaborate, and support each other, thereby building social capital [144]. For example, community centers and parks provide spaces for informal gatherings, organized events, and cultural activities, fostering a shared sense of belonging [141,145]. Such spaces help reduce social isolation, a factor that has been shown to contribute to higher levels of community resilience during crises by enabling quick, collective responses [146,147].

Additionally, creating physical social infrastructure can support the goals of a just transition if these spaces are designed to foster inclusive participation in community planning and decision-making processes [148]. Public spaces, such as local town halls and community centers, provide forums for community dialogue and collective problem-solving where residents can voice concerns and share ideas, which ideally translate into policymaking [149,150]. This helps to ensure that just transition efforts are equitable, as it brings diverse perspectives into the planning process and prioritizes the needs of vulnerable groups who may be disproportionately affected by economic or environmental changes [151]. Providing accessible and inclusive spaces is a crucial step towards more participatory processes which are essential for identifying local assets and challenges, ultimately leading to more effective planning and implementation of sustainable practices [152].

However, a significant political challenge in fostering citizen participation lies in aligning national resource allocation and policymaking with local decision-making and design processes. National programs often operate under broad mandates aimed at addressing systemic issues, which can result in a mismatch between the priorities set at the national level and the specific needs of local communities. For example, policies designed to distribute resources more equitably at the national scale may inadvertently overlook localized vulnerabilities or fail to account for cultural, economic, and environmental differences across regions [153,154]. Additionally, national interventions may constrain local autonomy by imposing standardized solutions, thereby limiting the capacity of citizens to innovate or implement context-specific strategies [155]. Conversely, challenges can also arise when local preferences or demands conflict with national priorities, particularly when local initiatives are perceived as inefficient or counterproductive on a broader scale [156]. Such tensions highlight the need for adaptive governance frameworks that balance local agency with national goals, ensuring that policies are both context-sensitive and strategically aligned with broader objectives [157]. Achieving this balance requires multi-level governance systems that integrate robust mechanisms for collaboration, accountability, and flexibility. In this context, establishing mechanisms for cross-governance and multi-stakeholder collaboration, capacity-building initiatives, and experimental approaches can enhance trust, legitimacy, and overall effectiveness [158–160].

6.2. Welfare State Provisions: Buffering Vulnerabilities While Supporting Transformation

Beyond the physical elements, the goods and services provided by the welfare state are essential for strengthening individual resilience and enhancing the capacity to adapt to a changing economy. More specifically, welfare state provisions offer social safety nets and financial protections, along with access to healthcare and education for the population. The welfare state's role in providing social goods and services aligns directly with the objectives of transformative resilience and just transition by protecting individuals from the immediate impacts of economic and environmental disruptions while fostering long-term structural changes [161]. More specifically, monetary welfare provisions, such as unemployment benefits and income support, help buffer vulnerable populations against the economic consequences of transitions [162]. In the context of a just transition framework, these policies prevent displaced workers from facing poverty and exclusion, aligning with just transition's goal of distributive justice by providing an equitable safety net [163,164]. At the same time, these provisions support resilience by creating a foundation upon which individuals can adapt to change, as economic security allows them to pursue retraining and reemployment options without falling into immediate economic distress [165,166]. This combination of immediate support and long-term adaptation bridges resilience's adaptive goals and just transition's protective aims.

Moreover, the decommodification of education and healthcare, which makes these services universally accessible and free or low-cost, plays a critical role in supporting transformative resilience and just transition. When education and healthcare are commodified, they are often inaccessible to low-income individuals, leaving these populations more vulnerable to economic transitions and environmental stressors [167]. Decommodified services, however, level the playing field, allowing a broader segment of society to build the skills and health needed to adapt to change [168,169]. Public education systems support individuals by ensuring that everyone can acquire the knowledge and skills needed to participate in and contribute to a greener economy [170,171]. Similarly, healthcare that is universally accessible without significant personal cost encourages preventive care and regular health maintenance, which reduces the strain on healthcare systems during crises [172,173]. A healthier population is better equipped to engage in sustainable practices, reducing the risk of negative health-related outcomes. Consequently, the decommodification of the welfare state lowers economic inequalities [174], which has been found to have positive effects on sustainable development [175,176]. Accordingly, societies with lower inequality are generally more stable and better prepared for long-term planning and environmental initiatives, which is essential for promoting both justice and resilience [177,178].

6.3. Eco-Social Policies: Designing Inclusive and Sustainable Policies for Resilience and Transition

Eco-social policies are strategic frameworks that specifically address the socio-economic dimensions of climate action, aiming to make environmental transitions fair, inclusive, and sustainable [179,180]. Unlike traditional welfare state provisions, which provide direct support like healthcare or unemployment benefits, eco-social policies create long-term frameworks that guide societies toward equitable and adaptive transitions in response to climate change [181,182]. Thus, eco-social policies distinguish themselves from more traditional social policies by reconsidering the relationship between social protection and environmental sustainability within a broader, systemic framework. While traditional welfare systems have predominantly focused on mitigating social risks, eco-social policies integrate ecological imperatives into the core of social policy [183]. Essentially, eco-social policies advocate for the decommodification of labor, emphasizing the intrinsic value of work and care beyond its economic utility [184]. This shift aligns with a rethinking of economic structures, where the decoupling of economic growth from environmental harm becomes a foundational principle [185]. Additionally, such policies acknowledge that climate impacts and the transition to green economies are unevenly distributed, often exacerbating existing inequalities [180]. In this respect, more progressive policies reflect an effort to redistribute the burdens and benefits of environmental transitions in an equitable manner [186]. Thus, while eco-social policies are deeply connected to conventional social policies, they emphasize more systemic transformations that address the interdependencies between social welfare, environmental sustainability, and economic structures. In this context, Brown and Chang [187] define eco-social policies as those specifically designed to address social welfare needs while simultaneously recognizing the importance of climate change mitigation and adaptation. They identify five key dimensions of such policies: eco-social infrastructure, eco-social welfare reform, eco-social regulation, eco-social safety nets, and measures to offset regressive outcomes.

In this regard, alongside the development of socially and environmentally resilient infrastructure, eco-social policies place particular emphasis on the intersection of work, care, and sustainability [187]. Through eco-social welfare reforms, policies that prioritize skill development and retraining for green jobs are essential in supporting a fair transition for workers currently employed in carbon-intensive industries [188,189]. These "transitional assistance policies" often include policies already present in the just transition framework, such as compensation and subsidized retraining programs to provide workers with the skills necessary for employment in more sustainable industries [119,124]. Tailoring retraining programs to the specific needs of local economies ensures that workers can transition smoothly into new, sustainable jobs without facing economic instability or displacement, promoting both individual and regional resilience [190–192]. Additionally, fair labor standards in green industries are essential for creating stable, high-quality jobs and preventing exploitation [193]. These policies, which cover fair wages, safe working environments, and worker rights in new industries, address potential risks of precarity in green sectors [194,195]. Additional policy measures, including working time reduction, strengthening women's participation in the labor market, decommodifying labor, and strengthening union representation, are also recognized as critical to enhancing the sustainability dimensions of the welfare state [196–199]. Decoupling social policies from growth-oriented frameworks can thereby promote inclusivity, ensuring equitable support throughout economic transitions while simultaneously fostering the long-term resilience and adaptive capacity of society.

In addition to enacting policies that facilitate fair labor market participation, it is essential to ensure individuals have a meaningful voice in decision-making processes [160]. Therefore, policies must prioritize citizen participation in climate transition planning, addressing all aspects of social justice while also emphasizing adaptive governance [200–202]. Policies that facilitate participatory decision-making give individuals a voice in shaping transitions, ensuring that plans reflect local priorities, values, and needs [203]. By fostering local governance and requiring community input in green policy development, these frameworks not only support societal adaptability but also uphold justice [204]. This participatory approach enables individuals to actively contribute to the design and implementation of policies navigating the economic transition while also enhancing their resilience to shocks by strengthening their adaptive capacities.

7. Conclusions

This paper serves as a first exploration of transformative resilience and just transition as interdependent, reinforcing concepts. While each concept has been studied extensively in isolation, their potential synergy remains underexplored. This paper explores the potential for integrating these two frameworks by first examining their overlapping and distinct dimensions. A systematic literature review is conducted to capture the entire scope of existing research on transformative resilience and just transition. Additionally, a Biterm Topic Model (BTM) is employed to identify dominant themes and explore areas of overlap and divergence between the two concepts, providing a foundation for integrating both concepts in future policy design.

Transformative resilience focuses on adaptation and transformation in response to crises and shocks but can sometimes overlook social inequities. On the other hand, just transition emphasizes justice and fairness for affected communities, yet it may lack the long-term adaptive strategies needed for regions to sustain transformations over time. Integrating these two approaches is particularly important in the context of climate adaptation and economic transformation. A focus solely on resilience may risk marginalizing justice concerns, leaving vulnerable populations without adequate support. Conversely, an exclusive focus on just transition may provide immediate relief but fail to develop the necessary adaptive strategies for long-term stability and sustainable transformation. By combining these frameworks, it can be ensured that both social justice and long-term resilience are built into the transition process. Therefore, combining the more place-based perspective of transformative resilience with the people-centered approach of just transition offers a more comprehensive way to address current socio-economic and environmental challenges.

Building on these insights, this paper also lays the groundwork for more targeted investigations into how the integration of transformative resilience and just transition can be realized in real-world policy settings. As an initial step toward bridging the two concepts in policy, this paper highlights the critical role of the welfare state. By investing in physical social infrastructure, delivering public goods and services, and designing eco-social policies, the synergies between transformative resilience and just transition can be effectively realized. In this context, welfare state policies not only address immediate social needs but also enhance regional capacity, enabling individuals to adapt to future challenges. Furthermore, these policies ensure that interventions are both people-centered and place-specific, promoting flexibility and fostering participatory engagement throughout the policy process, thereby reinforcing the connection between transformative resilience and just transition.

In practical terms, the findings from this paper have the potential to inform the creation of new policy tools and strategies that more effectively strike a balance between justice and resilience in transition processes. The insights offered provide a foundation for future research that evaluates the real-world effectiveness of such integrated policies. While this paper offers first insights into the role of welfare state policies in connecting transformative resilience and just transition, it is important to acknowledge that this discussion intentionally remains generalized. Future studies, particularly empirical research in specific contexts, are needed to deepen and refine these findings, exploring how welfare state policies can be tailored and implemented effectively within different socio-political settings. Additionally, future studies should explore how the frameworks of transformative resilience and just transition can be operationalized together. This could involve detailed case studies of regions or sectors where elements of both frameworks have been implemented, shedding light on their practical benefits, potential synergies, and inherent trade-offs. Finally, future studies should address the challenges of harmonizing the differing priorities of these frameworks, such as managing tensions between short-term relief measures and long-term structural change or reconciling community-specific needs with broader regional or national objectives.

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