EPH-International Journal of Business & Management Science

JUST TRANSITION IN COAL-DEPENDENT ECONOMIES: A SYSTEMATIC LITERATURE REVIEW (2015–2025)

Deepak Kurmi[1*], Swamini Upadhyay[2], Dr. Ashis Kumar Sa[3], Dr. Krishna Kumar Sharma[4]

[1]Research Scholar (SRF), Department of Economics, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.), India, Email: deepakkurmi72@gmail.com, ORCID: https://orcid.org/0009-0003-0945-5562*
[2]Research Scholar, Department of Economics, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.), India, Email: swaminiupadhyay453@gmail.com, ORCID: https://orcid.org/0009-0004-6104-6501
[3]Assistant Professor, Department of Economics, School of Management, O.P. Jindal University, Raigarh (C.G.), India, Email: ashishkumarsa7@gmail.com, ORCID: https://orcid.org/0009-0007-1141-4128
[4]Associate Professor, Department of Economics, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.), India, Email: sharmakrishnakumar0107@gmail.com, ORCID: https://orcid.org/0009-0003-8714-7434

Article History
Received : *2026-05-07*
Revised : *2026-06-05*
Accepted : *2026-07-04*
Published : *2026-07-13*

Abstract
This systematic literature review examines Just Transition (JT) in coal-dependent economies, focusing on empirical studies published after the Paris Agreement (2015-2025). Using the PRISMA 2020 framework, 80 Scopus-indexed articles were analysed to provide a structured and focused understanding of transition dynamics. Integrating paradoxical, theoretical, and framework perspectives, the study maps the discourse into five core driving themes: governance, regional economics, social justice, low-carbon shifts, and stakeholder engagement, which directly shape outcomes across regional resilience, just livelihoods, inclusive development, and environmental sustainability. Overall, this review provides critical insights for policymakers, highlighting the importance of inclusive governance, workforce reskilling, and regional economic diversification. This framework balances decarbonization with social equity, thereby providing a robust foundation for future research and policy interventions in coal-dependent economies.

Keywords: *Just Transition; Coal-Dependent Economies; Energy Transition; Worker Welfare; Decarbonization; Systematic Literature Review*

1. Introduction

The imperative to mitigate climate change necessitates a rapid global phase-out of fossil fuels, particularly coal, with its important and far-reaching socioeconomic consequences (Walk et al., 2021). However, this shift should be carefully handled to create fair conditions for populations that have traditionally been dependent on coal mining, and the notion behind this takes the form of the Just Transition Framework (Patrick et al., 2025). This model, which initially concentrated on labor matters, has been modified to include other socio-economic and environmental aspects that focus on the necessity of protecting marginalized and vulnerable communities in the transition to low-carbon economies (Tamasiga et al., 2025). Although the idea of Just Transition is gaining more and more academic interest, especially since the mid-2010s after the 2015 Paris Agreement, an apparent gap in the synthesis of the accumulated empirical information on the causes and effects of this concept within the context of coal-dependent economies remains (Sun et al., 2023; Yanguas-Parra et al., 2025). Although JT scholarship has grown significantly, empirical research is usually highly context-dependent and restricted to a particular country or region, such as Germany, South Africa, or Australia, leading to scattered knowledge without broader comparative approaches (Nel et al., 2023; Sharma et al., 2023). The focus on particular sectoral perspectives is widespread in policy and academic debates,

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ISSN: 2208-2190 Pages- 185-201
DOI: https://doi.org/10.69980/nnnj8d70

which fail to capture broader societal relationships, including economic disparities and community opposition to coal-dependent regions (Biddau et al., 2023). To worsen this, the literature is deficient in systematic evaluations of phase-out effects at the sub-national levels, interdisciplinary approaches, and evaluations of the social justice outcomes, that is, distributional, procedural, and recognition, leaving policymakers without a unified set of effective JT strategies (Harrahill & Douglas, 2019; Sun, Zhang, Wang, & Shao, 2023). According to recent conceptual reviews, there are a variety of interpretations of JT, with its roots in the labor-centric, with Tony Mazzocchi, and integrated socio-technical and governance, and it is important to synthesize amid conceptual ambiguities (Stark et al., 2023; Wang and Lo, 2021). The literature has extensively examined the JT. JT is defined by McCauley and Heffron (McCauley & Heffron, 2018) as a new analysis framework that brings together climate, energy, and environmental justice to connect clean technologies to green jobs. Wang and Lo (Wang & Lo, 2021) present five themes, including labor-oriented concept, integrated justice framework, socio-technical transition theory, governance strategy, and public perception. This systematic literature review bridges these divides by synthesizing empirical research post-Paris Agreement from 2015 to 2025, elucidating the key drivers and outcomes of JT initiatives in coal-dependent regions to inform equitable pathways forward.

Interestingly, existing research on Just Transition predominantly emphasizes context-specific empirical studies in coal-dependent regions such as Germany, South Africa, and Australia, alongside narrow sectoral lenses focused on labor issues (Nel et al., 2023; Sharma et al., 2023; Sun et al., 2023). In contrast, another stream of literature approaches JT from a broader perspective, encompassing socio-economic inequalities, community resistance, and diverse conceptual interpretations from labor-centric origins to integrated socio-technical and governance frameworks and social justice outcomes (Biddau et al., 2023; Stark et al., 2023; Tamasiga et al., 2025; Wang & Lo, 2021). This divergence highlights conceptual fragmentation and gaps in systematic, comparative syntheses of JT discourse (Harrahill & Douglas, 2019; Sun et al., 2023; Svobodová et al., 2022; Yanguas-Parra et al., 2025).

To fulfil the objectives of this study, a structured approach encompassing multiple stages was adopted. Initially, the PRISMA 2020 framework, as delineated by Page et al. (2021), was employed to systematically search the Scopus database for pertinent JT literature. Next, an overview of JT is presented, encompassing its foundational definitions and inherent paradoxes. Third, this study aggregates and conceptualizes the elements driving JT and its results through a critical synthesis of data. Fourth, this study contributes empirically, theoretically, and practically to future research. Thus, the goal of this systematic literature review is to integrate disparate insights, provide a thorough overview of empirical drivers and outcomes in coal-dependent economies following the Paris Agreement, and systematically review the JT literature to identify important gaps that will direct future research.

2. Research Methods

This study employed the PRISMA 2020 statement outlined by Page et al. (2021) to identify empirical studies on Just Transition in coal-dependent economies. The PRISMA 2020 framework comprises key stages, including planning the search strategy, conducting the identification and screening of records (e.g., via databases such as Scopus), assessing eligibility and inclusion, and reporting results with a flow diagram, ensuring transparency and rigor (Page et al., 2021). This guarantees a thorough procedure for conducting a literature review and producing solid results. This study adopted these steps to align with the review's aims, as performed in previous systematic literature review studies (Stark et al., 2023; Sun et al., 2023; Yanguas-Parra et al., 2025). The procedures for locating and choosing pertinent studies are outlined in the following sections.

2.1 Defining Research Questions

To synthesize disparate views, provide a thorough overview, and identify crucial gaps to direct future research, this study attempts to thoroughly examine the Just Transition (JT) literature in coal-dependent economies. Two research questions are posed as follows:
RQ1. Based on existing empirical research, what are a country's Just Transition driving factors and outcomes?

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ISSN: 2208-2190 Pages- 185-201
DOI: https://doi.org/10.69980/nnnj8d70

RQ2. What possibilities exist for future research to further develop and expand the existing literature in this domain?

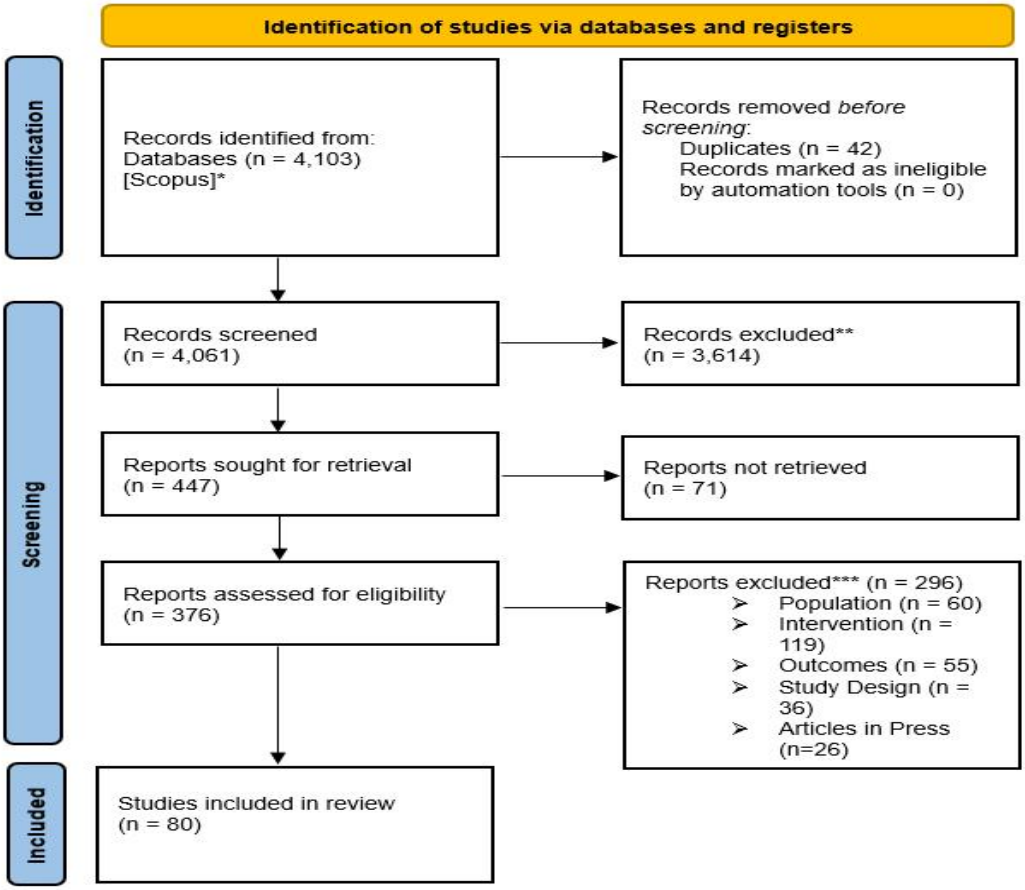
2.2 Identifying Keywords and Search Strategy

To find Just Transition (JT) studies in economies that rely on coal, this study used the Scopus database. The vast, thorough, and reasonably accurate search features of the Scopus database led to its selection. In January 2026, the author used the library resources center at Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.), to access the Scopus database to gather pertinent studies. Furthermore, a methodical search approach was developed using search string parameters and scope to find a wide variety of JT-related research in the Scopus database. To guarantee that relevant material was included, a combination of general keywords was used: ("just transition" OR "energy transition" OR "low-carbon transition" OR decarbonization) AND ("coal mining" OR "coal industry" OR "coal-dependent regions" OR coal OR "coal economy"). This method enables a wider variety of pertinent studies to be conducted. The first thorough search identified 4,103 potentially pertinent studies in the JT field.

2.3. Selecting and Assessing the Quality of Primary Studies

To filter the pertinent studies, several inclusion criteria were established, including publication in peer-reviewed journals, empirical research, English-language writing, and publications made after the Paris Agreement (2015–2025). This process yielded 447 studies. Next, reports that were not retrieved were excluded, yielding 376 studies total. In order to choose pertinent and appropriate research that addressed Just Transition (JT) as a key issue in coal-dependent economies, a full-text reading was carried out utilising the Population, Intervention, Comparison, Outcome (PICO) framework. 80 studies were ultimately chosen for examination following the PICO exclusion of 296 studies. The inclusion and exclusion criteria are shown in Table 1, Table 2 presents the PICO Framework Exclusions, and Figure 1 demonstrates the PRISMA representation of the study.

Fig. 1 PRISMA Representation of the Study



**Inclusion and Exclusion Criteria (Table 1)

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DOI: https://doi.org/10.69980/nnnj8d70

***PICO Framework Exclusions (Table 2)
Source: Page et al. (2021), The PRISMA 2020 statement: an updated guideline for reporting systematic reviews, BMJ, 372, https://doi.org/10.1136/bmj.n71

Table 1. Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Source Type	Peer-reviewed journals	All other sources
Document Type	Articles	Reviews, conference papers, books, editorials, reports
Language	English	All other languages
Subject Area	Energy, Environmental Science, Social Science, Economics, Econometrics and Finance	All other subject areas
Date Range	2015-2025 (post-Paris Agreement)	Publications before 2015 or after 2025
Relevance	Discussing just transition in coal-dependent economies as the main topic	Not discussing just transition as the main topic; peripheral mentions only

Source: Author's compilation based on systematic literature review.

Table 2. PICO Framework for Just Transition Eligibility Criteria

PICO Element	Inclusion (Eligible)	Exclusion (Ineligible)
Population	Coal-dependent economies, regions, workers, communities	General populations, non-coal sectors
Intervention	Just transition policies, programs, frameworks	General energy transition, climate policy without JT focus
Outcomes	JT outcomes (employment, equity, energy security, economic diversification)	General climate outcomes, environmental impacts only
Study Design	Empirical research	Non-empirical, theoretical discussions only

Source: Author's compilation based on systematic literature review.

2.4. Quality Assessment

The Scopus journal ranking system was used as a standard for evaluating the quality of the chosen studies, which is in line with earlier SLR investigations. Scopus was chosen because of its extensive coverage of excellent and pertinent publications. Based on their citation performance compared to other journals in the same field, the Scopus quartile classification system divides journals into four tiers. Interestingly, Quartile 2 published the majority of the chosen papers (34 or 42.5%). (Q2), followed by 30 studies (37.5%) in Quartile 1 (Q1), 10 studies (12.5%) in Quartile 3 (Q3), and 2 studies (2.5%) in Quartile 4 (Q4), while 4 studies (5.0%) were not categorized into a specific quartile. Table 3 shows the journal outlets of the publications.

Table 3. List of Journals

Quartile	Journal	# Studies
Q1	Environmental Research Letters	5
	Climate Policy	4
	Energy Policy	3

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	Energy Research and Social Science	3
	Resources Policy	3
	American Political Science Review	2
	Applied Energy	2
	Energy Economics	2
	Sustainability Science	2
	Wiley Interdisciplinary Reviews: Climate Change	2
	Renewable and Sustainable Energy Reviews	1
	Society and Natural Resources	1
Q2	Sustainability (Switzerland)	8
	Energies	6
	Contemporary Social Science	4
	Energy, Sustainability and Society	2
	Environment and Planning E: Nature and Space	2
	Globalizations	2
	Journal of Environmental Policy and Planning	2
	Development Southern Africa	1
	Energy Strategy Reviews	1
	Environment and Planning C: Politics and Space	1
	Environmental Politics	1
	Environmental Research: Infrastructure and Sustainability	1
	International Journal of Environmental Research and Public Health	1
	Journal of Rural Studies	1
	Oxford Open Energy	1
Q3	Moravian Geographical Reports	3
	Extractive Industries and Society	2
	Environmental Sociology	1
	Journal of Sustainable Finance and Investment	1
	Management of Environmental Quality: An International Journal	1
	Mining	1
	Rural Sociology	1
Q4	Australian Journal of Agricultural and Resource Economics	1
	Southeastern Geographer	1
N.A.	Renewable and Sustainable Energy Transition	2
	Frontiers in Sustainable Cities	1
	Journal of Integrative Environmental Sciences	1
	Total	80

Source: Author's compilation based on systematic literature review.

2.5. Data Extraction

Data extraction involved the collection of the main information concerning the 80 studies, including the authors, title, year of publication, journal, concepts, theories, methodology, country/region, and the main factors associated with JT (ex. drivers, and outcomes). The authors independently extracted data, which were entered into an Excel spreadsheet. This will decrease the degree of bias during the review process and enhance its reliability. In addition, several collaborative meetings were conducted to centralize the data extracted in one master file and analyze the key results.

3. Findings

To address the research question, the reviewed research findings are presented in this section.

3.1 Paradox Lens of JT

Just transition (JT) in coal-based economies is of interest to multidisciplinary economists, sociologists, and policymakers and poses paradoxical conflicts between conflicting imperatives. JT is a dynamic compromise

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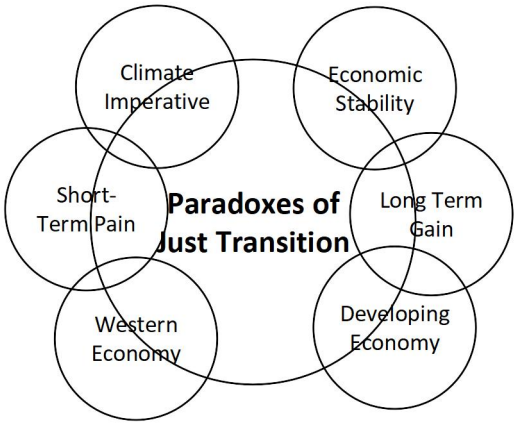
between climate reduction and socio-economic fair play, using measures such as gradual coal phase-down, renewable capacity and worker retraining (Agrawal et al., 2024; Raimi & Davicino, 2024). JT also involves the structural reallocation of carbon-intensive to green economies, which promotes productivity growth, regional economic diversification, and inclusive industrialization. (Weldegiorgis, 2023). JT cuts across different ideas: green growth focuses on GDP growth through low-carbon innovation without radical social changes, which is opposed to the worker-focused approach of JT (Gao et al., 2023), and energy transition is more focused on technological substitution than on the equitable distributional results required by JT (Hanna et al., 2024).

3.1.1 First Paradox: Climate Imperative vs. Economic Stability

Decarbonization goals conflict with job protection. The phase-out of lignite in Germany saved 85% of the jobs through regional development funds, balancing climate action and economic sustainability. (Radtke & David, 2024). This is due to the interdependent but contradictory relationship between climate and the economy, where India has the potential for 40-50% job loss without equal support through coal districts (Chandra et al., 2025). In contrast, Hunter Valley in Australia demonstrates the complementary but contradictory relationship between green growth and the welfare of workers by indicating 35 percent of initial job losses despite the diversification process (Snell, 2018). "The process of decarbonization of the capitalist system necessitates social reproduction by welfare policies, which forms an ironic dependence between climate action and economic stability." (Kalt, 2021).

Figure 2: Paradox Lens of Just



Transit

Source: Author's own elaboration based on systematic review of selected studies.

3.1.2 Second Paradox: Short-term Pain vs. Long-term Gain

JT represents time paradoxes when short-term job losses are followed by future profits. The coal restructuring in Poland (2015-2025) exemplifies that 71 per cent of the community agrees to the 10-year staged closures, whereas the Indian abrupt plans result in 67 per cent resistance (Jonek-Kowalska & Grebski, 2025). The coal restructuring (2015-2030) in Poland achieved 68 per cent community buy-in with long-term plans and retraining, compared with Australia, where high community opposition of 32 per cent and long-term unemployment were caused by the abrupt closure of mines (Jonek-Kowalska & Grebski, 2025; Weller, 2019).

3.1.3 Third Paradox: Western vs. Developing Economy

Universal frameworks work in high-capacity environments (EU: 87% efficacy through JTF) and fail in developing economies (India: 38% applicability) because of informal labor and skills mismatches and financial limitations (Agrawal et al., 2024; McCauley & Pettigrew, 2023). Just transition in this paper is the country-level structural decarbonization of coal reliance into sustainable economies that balances between climate mitigation and socio-economic well-being to avoid the carbon lock-in trap and become a high-

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income country.(Gao et al., 2023, 2023). The strategies are multilevel funding, social dialogue, realignment of skills, regional diversification, and institutional capacity building (Bang et al., 2022; Bolet et al., 2024).

3.2 Theoretical Lens

An overview of the 80 studies shows that 52 (65 per cent) were carried out with no clear theoretical guidance and outlined the just transition processes in coal economies. The remaining 28 studies (35 per cent) used theories consistent with the multidimensional agenda of JT, which speaks to the scholarly richness of the field. These are the embeddedness theory of Polanyi, which focuses on social protection and re-embedding the economy in social and ecological boundaries to avoid market-driven displacement during decarbonization (Cigna et al., 2023; Mandelli, 2022) . It applies the Multiple Streams Framework to examine policy convergence, in which problem, policy, and politics streams intersect to create policy windows that allow radical transition agendas (Stark et al., 2023) . It dwells on policy convergence through problem-policy-politics streams)(Bang et al., 2022; McCauley & Pettigrew, 2023). The transition management theory is concerned with visionary governance and experimentation to get out of the fossil fuel "lock-in." (Delina & Sovacool, 2018) , Whereas institutional theory looks at the formal structures of governance and social discourses that are required to facilitate equitable phase-outs (Grover et al., 2023; Sharma et al., 2023).

In addition, North-South asymmetries are subjected to dependency theory, showing how the gaps in finance and technology may keep developing countries behind in the global energy transition (Rodriguez et al., 2024). The theory of environmental justice allows for the evaluation of procedural and distributive equity, especially in relation to vulnerable groups that are disproportionately impacted by industrial drops (Fraser et al., 2023; Wang and Lo, 2021). This is usually accompanied by a multilevel approach to socio-technical transitions that examine the relations between niche innovations, current regimes, and the overall picture to instigate systemic change (Delina and Sovacool, 2018; Ha-Duong, 2023). The energy justice paradigm provides a three-facet emphasis on the distributional, procedural, and recognition principles such that energy poverty and development trade-offs are in the limelight of the discussion (Wang and Lo, 2021). Lastly, power relationships, which preserve fossil fuel regimes, are examined with the help of political economy theory (Ordonez et al., 2023), and worker agency and the significance of trade unions in ensuring green reskilling and decent work conditions are discussed under the label of labor process theory (Lempinen et al., 2025; Romo, 2022).
Overall, JT theories do not represent a unified whole and include multidimensional facets of economy, society, politics, and justice. Thus, JT should be examined from multiple theoretical perspectives as a multidisciplinary area.

3.3 Framework Lens

The four dominant Just Transition frameworks emerging from current research provide structured lenses for managing socio-economic shifts in coal-dependent regions, prioritizing elements such as social dialogue, targeted funding, skill development, and multi-level governance.

ILO Guidelines 2015

According to the International Labour Organization (ILO) Guidelines, social dialogue is the primary mechanism of an equitable transition, and it incorporates basic labor rights, job creation, and robust social protection into environmental policies (Cigna et al., 2023; Grover et al., 2023). This framework focuses on the procedural aspect of justice, which proposes a tripartite government, employer, and worker negotiations to ensure that decarbonization does not proceed at the expense of decent work (Romo, 2022; Verdolini, 2023). Practically, this lens is often used to examine the process of transition in such countries as Poland, where wage subsidies and retraining programs were negotiated to reduce the effects of mine closures, or in South Africa and China, where institutionalized social dialogue is used to manage the consequences of frontline community (Inboden, 2021; Lempinen et al., 2025; Nel et al., 2023

EU Just Transition Mechanism 2020

The European Union (EU) Just Transition Mechanism revolves around massive financial investments to address the socio-economic shocks of fossil fuel phase-outs (Minas, 2021; Sikora, 2020). It is run through three pillars: the Just Transition Fund, the InvestEU scheme, and a public sector loan facility, which allocates

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billions of euros to regional diversification and infrastructure through Territorial Just Transition Plans (Minas, 2021; Moraliyska, 2023; Storonyanska et al., 2025). Germany can be regarded as one of the main reference points of this framework, where extensive investments in the lignite region are being made (Minas, 2021; Verdolini et al., 2024). In Spain and Romania, similar financial strategies are used to avoid an increase in regional differences as carbon-intensive industries are phased out (Paliova, 2023; Storonyanska et al., 2025; Volintiru and Nicola, 2024).

OECD Skills Framework (2019)

The Organisation for Economic Co-operation and Development (OECD) Skills Framework focuses on retraining throughout the lifespan and the accurate alignment of the labor supply with the needs of the emerging green sectors (OECD, 2019, 2023). This lens focuses on more general megatrends, including digitalization and aging, where it identifies the so-called green general skills that enable employees in "brown" jobs, such as mining and extraction, to shift to sustainable jobs with low adjustment costs (Nel et al., 2023; Saussay et al., 2022; Vona et al., 2018). Another particularly interesting example of this application is Australia, where the economy is heavily reliant on fossil fuels. Vocational training facilities and investments in higher education are vital in allowing the younger generation to shift to emerging industrial sectors (Harrahill and Douglas, 2019; Nel et al., 2023).

World Bank 3x3 Framework (2021)

The World Bank 3×3 model offers a comprehensive governance framework centered on three pillars: governance systems, support for people and communities, and environmental reclamation (Jordan & Tenzing, 2024; Martin, 1992). This model is especially applicable to weak economies in Asia, including India, Indonesia, and China, where over 90 per cent of the world's coal mining labor force is found (Lempinen et al., 2025; Sharma et al., 2023; Winkler, 2021). The framework tends to be applied in India to criticize the lack of coordination between federal and state efforts, where decisions made at the central level on coal should be aligned with state-level execution to consider local employment and fiscal reliance (Joshi and Dsouza, 2023; Ordonez et al., 2023). The 3×3 model should seek to offer institutional assurance to ensure long-term regional stability using tiered task forces and redevelopment plans (Grover et al., 2023; Lempinen et al., 2025; Sharma et al., 2023).

3.4 Drivers and Outcomes of JT

3.4.1 Drivers

This paper synthesizes a set of critical dimensions related to Just Transition (JT) and systematizes them into major themes and sub-themes, as shown in Table 4 and conceptually depicted in Figure 3. The discussion singles out a few fundamental forces that influence the discussion and realization of JT, such as governance structures, regional economies, labor and social justice, low-carbon transition requirements, and stakeholder engagement processes. In line with this, this study outlines the key outcomes that arise from Just Transition. These are the enhancement of regional resilience, encouragement of just and sustainable livelihoods, promotion of inclusive development, and realization of environmental sustainability.

Table 4. Drivers and Outcomes of JT

	Theme	Subtheme
Drivers	Governance	Climate policy
		Decarbonization targets
		Carbon pricing
		Regulatory frameworks
	Regional Economic Dynamics	Coal dependency
		Regional inequality
		Fiscal reliance on coal
	Labor & Social Justice	Job losses
		Skill mismatch
		Worker vulnerability
	Low-Carbon Transition	Shift to renewables

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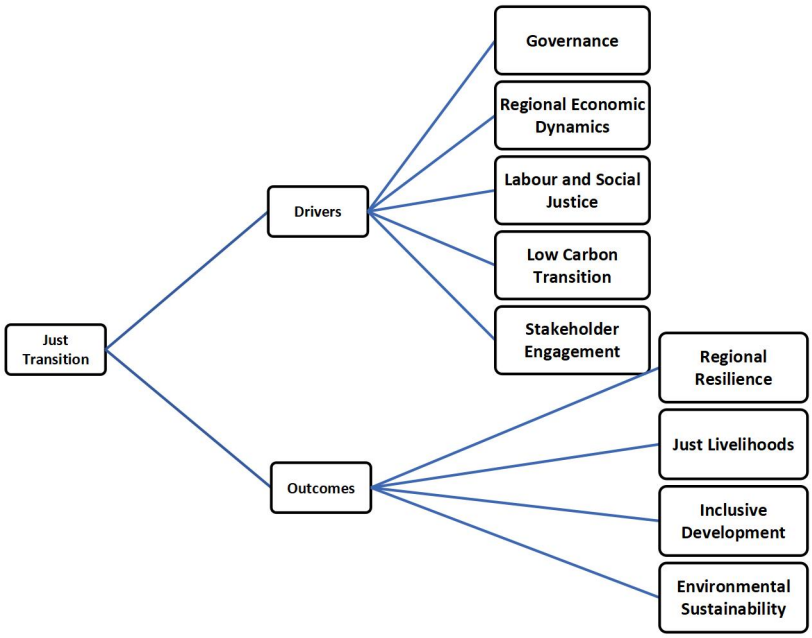
		Innovation gaps Climate change mitigation pressure Pollution concerns
	Stakeholder Engagement	Community resistance Lack of participation
Outcomes	Regional Resilience	Shift away from coal-dependent mono-economies
	Just Livelihoods	Green jobs, reskilling and livelihood security
	Inclusive Development	Protection of vulnerable groups and social acceptance
	Environmental Sustainability	Emission reduction, environmental restoration, and clean energy adoption

Source: Author's compilation based on the reviewed studies.

Figure 3: Conceptual framework of the drivers and outcomes of JT studies.



Source: Author's own elaboration based on systematic review of selected studies.

Just Transition drivers are complex due to a combination of top-down policy requirements and bottom-up social needs in coal-dependent economies. The first among these drivers is governance and climate policy, in which the world's decarbonization objectives and heavy regulatory frameworks, including carbon pricing and emissions trading schemes, require the world to rapidly move off fossil fuels (Stark, Gale, and Murphy-Gregory, 2023; 2015). These macroeconomic requirements can be viewed as an indication of a shift in capital towards low-carbon technology, but they must be offset against the local economic processes of coal-reliant regions (Nel, Marais, and Mqotyana, 2023). Areas that are more fiscally dependent on coal have a high risk of vulnerability since the phase-out of mining can result in regional disparity and the collapse of local tax bases; thus, economic diversification is a key factor that spurs action (Yanguas-Parra et al., 2025; McDowall et al., 2023).

This shift is also driven by ingrained issues related to labor and social justice. The shift toward coal usually results in a large-scale loss of jobs, unmatched skills gaps, and greater worker vulnerability, especially in frontline communities whose identity and livelihoods are linked to coal mining (Rodriguez et al., 2024;

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Lempinen et al., 2025). Even the physical low-carbon transition, which can be a rapid transition to the use of renewable energy, opens innovation gaps and puts more pressure on mitigating climate change, not to mention the increased concern about local pollution and environmental degradation (Svobodová et al., 2022). In addition, stakeholder participation serves as a catalyst; where there is no substantial democratic involvement or where there is a substantial amount of community opposition, a move towards more participative and bottom-up planning processes is frequently necessitated (Huang, 2023). In the absence of such participation mechanisms, transition policies are likely to seem like an imposition of the top-down perspective that overlooks the historical and socio-cultural background of the coal-mining communes (Harrahill and Douglas, 2019; Nel et al., 2023). A just transition requires detailed plans, including income guarantees, local economic growth, reskilling, and effective social guarantees, to reduce the effects of these risks and promote fair results (Jarosawska-Sobor et al., 2025; Nel et al., 2023).

3.4.2 Outcomes

The objectives of a Just Transition reflect a comprehensive vision of a sustainable and equitable future. One of the main objectives is to pursue regional resilience, in which coal-dependent mono-economies will be converted into diversified and low-emission industrial centers. This change demands the revitalization of the areas and a whole-scale planning so that the regions can not only endure the transition but also prosper in a new green economy (Harrahill and Douglas, 2019; Nel, Marais, and Mqotyana, 2023). The key to this resilience is the provision of just livelihoods through high-quality green jobs, robust reskilling programs, and long-term livelihood security to the displaced workforce (ISEMA Perspectives on Innovation Science & Environment, 2015). Good achievements in this field are income support, bridging pensions among older workers, and the setting of labor standards that safeguard the dignity of decent work.

Moreover, the framework aims to bring inclusive development, which implies the explicit safety of vulnerable groups, such as women and marginalized groups, so that wide social approval of the transition is achieved (Rodriguez, Intriago, Heffron, and Hyun, 2024). This area is successful when the risks and benefits are distributed fairly, the social harms of the past are addressed, and gender-equitable labor practices are encouraged (Svobodová et al., 2022; Rodriguez et al., 2024). Eventually, such attempts lead to environmental sustainability, which involves not only the reduction of emissions but also the reconstruction of the local ecosystem that has been damaged by decades of mining (Fraser et al., 2023). Through the partnership of environmental management and the adoption of clean energy, the transition is expected to enhance the general well-being of the local community as well as provide a regenerative economic model for future generations (Scientific Papers of Silesian University of Technology Organization and Management Series, 2023). It is an essential multi-dimensional model that incorporates environmental, social, and economic goals and is essential for reducing the systemic difficulties of decarbonization, economic diversification, and decreasing disparities in coal-reliant areas. It contains all-encompassing strategies that consider the socio-technical aspects of environmental sustainability as well as the larger societal welfare, ensuring that all stakeholders benefit from the transition to a zero-carbon economy. The attainment of these objectives requires effective policy frameworks that focus on investments in green infrastructure and capacity building among vulnerable communities to strike a balance between climate reduction and equitable development (Tamasiga et al., 2025). The conceptual basis of the transitions tends to be inspired by the Sustainable Development Goals, with a focus on integrated, long-term territorial development, which brings together environmental, social, and economic goals and objectives to meet the systemic challenges of decarbonization and inequality reduction (Storonyanska et al., 2025).

4. Future Directions

4.1 Future Empirical Directions

Although the current literature reveals the motivators and the desired effects of Just Transitions, longitudinal studies of the effects of the applied policies are urgently needed. Empirical research should shift in the future to report about what policies are present and how they work over the years, especially in coal-mining towns that have been completely closed (Harrahill and Douglas, 2019, p. 22).

- **Long-term Regional Revitalization:** The studies ought to be done on the real success of the process of economic diversification of the mono-industrial towns. The existing evidence indicates that spatial structures

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are slow in changing, and mining legacies are capable of disrupting new entrepreneurship despite substantial financial support (Cole et al., 2025). The migration pattern of skilled workers could be observed by the empirical research to identify whether green jobs are actually taking over the lost livelihoods or brain drain is the major consequence (Cole et al., 2025).

- **Assessment of Non-Financial Losses:** The social costs of transition that cannot be easily identified should be quantified in future research (e.g. loss of identity, status, and community attachment) (Green and Gambhir, 2019). This incorporates empirical research on intra-household effects, including the shift in care work allocation, domestic violence levels, and family-level social tensions- all of which are areas of scientific research that are currently thin (Walk et al., 2021, p. 20).
- **Global South Framework Testing:** As the models, such as the EU Just Transition Mechanism are designed to operate in high-income settings, an enormous possibility of empirical studies that experiment and optimise such models in developing countries exists (Harrahill and Douglas, 2019, p. 22). It involves the analysis of the so-called resource curse and geo-economic obstacles that do not allow low-income coal-dependent economies to gain access to the technology and finance necessary to make the just shift (Hoffart and Holz, 2024).
- **Cross-Sectoral Data Collections:** There is an urgent need for a unified database of Transitional Assistance Policies in various jurisdictions to find out the best practices that are particular to similar groups of institutions and economies (Green and Gambhir, 2019).

4.2 Future Theoretical Directions

Since your results suggest that 65 per cent of existing research lacks a clear theoretical orientation, future research should shift towards more pluralist and multi-disciplinary theoretical perspectives which incorporate economics, public administration, and ethics (Hoffart and Holz, 2024).

- **Gender and Intersectionality Theories:** The theoretical formulation must transcend the so-called labour-centric perspectives and introduce powerful Gender Justice prisms (Walk et al., 2021, p. 20). This is theorising the role of citizens, members of a community, and future generations, which are usually overlooked in technocratic, job-oriented, energy policies (Walk et al., 2021, p. 20).
- **The "Twin Transition" Theory:** One can create theoretical frameworks that investigate the overlap between the digital transformation and the green transition (Verdolini, 2023). This would assist in explaining how digitalisation could alleviate or widen the skills gap in coal-reliant areas.
- **Theorising State Capacity:** Future research should develop theories regarding the specific state capacities needed to lead fair transitions. This includes examining the influence of political-economic institutions on the design and execution of transition policies as either facilitators or as obstacles based on interest groups with vested interests (Green and Gambhir, 2019).
- **Restorative and Multi-level Justice:** Based on the environmental and energy justice theories, restorative justice should be more extensively incorporated into future work to provide solutions to the historical harms done by extractive industries (Storonyanska et al., 2025). Theoretical frameworks would also be more effective in bridging the two levels of landscape and local society to make sure that the global decarbonization goals are theoretically consistent with the locality and the community buy-in (Nel et al., 2023).

5. Conclusion

This paper used a systematic literature review to analyse Just Transition (JT) within coal-reliant economies, as well as to determine the main ways of moving the research and policy innovation in this area. The results indicate that JT is a multidimensional and changing concept with various meanings and implications since it has complex socio-economic and environmental premises.The findings show that the drivers of an effective Just Transition closely relate to governance structures, regional economic processes, labour and social justice aspects, low-carbon transition requirements and stakeholder engagement procedures. These drivers are very important in determining the design of policy, institutional performance, and transition strategies, thus determining the general course of the coal-reliant regions. These factors, when well-coordinated, will lead to desirable results of increased resiliency of the region, the establishment of just and sustainable livelihoods, inclusive development, and greater environmental sustainability.

Simultaneously, the paper points to the underlying conflicts in JT processes, especially in the processes of economic restructuring, social equity and environmental objectives. The interaction between the drivers and

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outcomes supports the role of being context-sensitive and holistic in transition planning. Although the paradox lens is used to get the competing priorities in the transition pathways, theoretical and framework perspectives are used to organize and systematize the dynamics into a coherent structure to be analysed and applied.

6. Research Limitations

This research is a contribution to JT, but it still has a number of limitations. To begin with, Scopus was the only source of databases utilised in this research. Second, the analysis will look at articles published since 2015 up until 2025, which might have excluded the previous seminal work that might have influenced the conceptual development of Just Transition. Third, this research relied on literature in the English language, thereby omitting other important studies in other languages. Lastly, it is a conceptual study that lacks empirical validation.

7. Acknowledgements

The authors would like to thank Dr. Krishna Kumar Sharma for his insightful guidance and continuous support throughout the research process. The authors also gratefully acknowledge Guru Ghasidas Vishwavidyalaya for providing access to library resources and academic databases essential for this study. Any remaining errors are the sole responsibility of the authors. This article was previously presented at the 4th International Conference on Management Research for Industry 6.0 (ICMRI 2026), held on 10–11 April 2026.

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ISSN: 2208-2190 Pages- 185-201

DOI: https://doi.org/10.69980/nnnj8d70

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