

Beyond green practices: A systematic review of mechanisms and boundary conditions shaping sustainable performance in the Chinese context

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Abstract: Organizations increasingly adopt green organizational practices, yet previous studies offer limited explanations for when and how these practices translate into sustainable performance, particularly in the Chinese context. Addressing this gap, this study conducts a PRISMA-guided systematic literature review of 336 peer-reviewed empirical studies drawn from Web of Science, Scopus, and CNKI. Through thematic synthesis, the review consolidates fragmented evidence into an integrated framework. The findings reveal that existing studies are primarily grounded in four theoretical perspectives: resource-based, institutional, leadership, and relational. Meanwhile, the green practices influence sustainable performance through two interdependent pathways: a capability pathway centered on green innovation and organizational capabilities, and a cultural-psychological pathway centered on organizational culture, identity, and employee states. Evidence further indicates that sustainable leadership functions as a critical boundary condition by shaping strategic attention, resource allocation, and implementation consistency, thereby explaining performance variation across firms. The study concludes that green practices create performance potential but require leadership activation and employee enactment to generate sustained outcomes. Practically, the findings suggest that organizations should prioritize leadership-driven, culturally embedded sustainability strategies rather than relying solely on technical or compliance-based initiatives.

Keywords: *Catalytic model, Dual-pathway mechanism, Environmental leadership, Green organizational practices, Sustainable leadership.*

1. Introduction

Environmental, social, and governance demands have transformed sustainable performance from a mere discretionary commitment into a core strategic requirement [1]. Following the United Nations Sustainable Development Goals and rising stakeholder scrutiny, many organizations are now aggressively pursuing the “Triple Bottom Line” to balance economic, environmental, and social goals [2]. Nevertheless, a troubling gap has emerged where adoption has outpaced actual results. While firms invest heavily in green organizational practices such as green supply chain management and green human resource management, these investments do not reliably translate into sustainable performance [3, 4]. Evidence suggests that some initiatives remain symbolic, drift into greenwashing, or become costly programs with limited strategic returns [5]. The core puzzle is therefore not whether firms adopt green practices, but why the same practices generate strong performance in some firms and weak performance in others. Consequently, this study treats implementation as the central unit of analysis, asking what specifically activates green practices into measurable outcomes.

Despite the rapid growth of this literature, the current understanding of this link is still constrained by four specific limitations. First, according to Hart and Freeman, the field suffers from theoretical fragmentation. Studies tend to rely on separate lenses, such as the natural resource-based view or stakeholder theory [6, 7], with limited integration. This separation makes it difficult to explain how

internal resources and external pressures jointly shape outcomes. Second, there is persistent mechanism ambiguity. While research often establishes that green practices correlate with performance, the causal pathways remain unclear; in particular, work tends to separate technical capability development from employee psychology and organizational culture [8]. As a result, less is known about how operational capabilities and cultural dynamics interact during implementation.

Third, the literature often reflects a neglect of boundary conditions. Leadership is frequently modeled merely as an antecedent rather than as a condition that changes *whether* practices work [9]. It is contended that without leader role modeling and reinforcement, practices often remain formal policies rather than becoming operating routines. Finally, global reviews often downplay the institutional context. This omission is particularly consequential for the Chinese context, where firms face strong government pressure to adopt environmental practices [10, 11] while also relying on unique mechanisms like *Guanxi* (social connection) and harmony for execution [12]. A context-specific synthesis is therefore needed to explain how these institutional and cultural forces shape implementation.

To bridge these gaps, this study conducts a PRISMA-based systematic literature review synthesizing evidence from 336 empirical studies. The objective is:

1. To develop a theoretical foundation that explains when and how green organizational practices translate into sustainable performance in the Chinese context.
2. To understand which theoretical perspectives dominate the field, identify the capability-based and psychological mechanisms that drive performance.
3. To determine how sustainable leadership functions as a boundary condition.

This review challenges the assumption that green practices are static assets where adoption automatically leads to performance, an assumption that fails to explain the wide variation in outcomes across firms. Instead, the argument is made that green practices create capacity but do not produce results on their own; firms convert practices into sustainable performance only when employees enact them, and leaders reinforce them. By shifting the unit of analysis from adoption to activation, this study makes three contributions. First, it bridges macro and micro explanations by integrating resource-based arguments (RBV, NRBV) with behavioral perspectives like upper echelons theory and social exchange theory. This clarifies the translation problem: external demands shape outcomes only when firms internalize them through managerial choices and everyday routines.

Second, the study specifies a dual-path mechanism, synthesizing evidence regarding a capability pathway (centered on green innovation and operations) and a cultural and psychological pathway (centered on green culture and engagement). Crucially, these pathways are posited to be interdependent, as cultural and psychological conditions often enable capability building by sustaining participation and learning. Third, sustainable leadership is positioned as an activation condition. This framing explains why adoption often fails and is especially relevant in the Chinese context, where values of harmony and collectivism shape how leaders build commitment. Ultimately, this study provides a roadmap for how organizations can ensure their green practices are enacted with consistency, credibility, and follow-through.

2. Materials and Methods

This systematic literature review (SLR) serves as a rigorous foundation for scientific investigation into the green practice-performance link. By synthesizing fragmented empirical evidence into a cohesive theoretical framework, this review identifies higher-order patterns that individual primary studies often overlook. To ensure that the findings are characterized by scientific rigor, transparency, and replicability, the search and selection protocol strictly adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [13]. Adherence to this established protocol mitigates researcher bias by enforcing a transparent audit trail, ensuring that the resulting synthesis of the relationship between green organizational practices and sustainable performance is derived from a comprehensive and objective selection of high-quality evidence.

The investigative process was structured into four sequential phases: (1) the identification of records through a targeted multi-database search; (2) the screening of titles and abstracts against predefined criteria; (3) the critical assessment of full-text articles for eligibility; and (4) the final inclusion of research for qualitative and thematic synthesis. The progression of the literature through these analytical stages is detailed in the PRISMA flow diagram (see Figure 1).

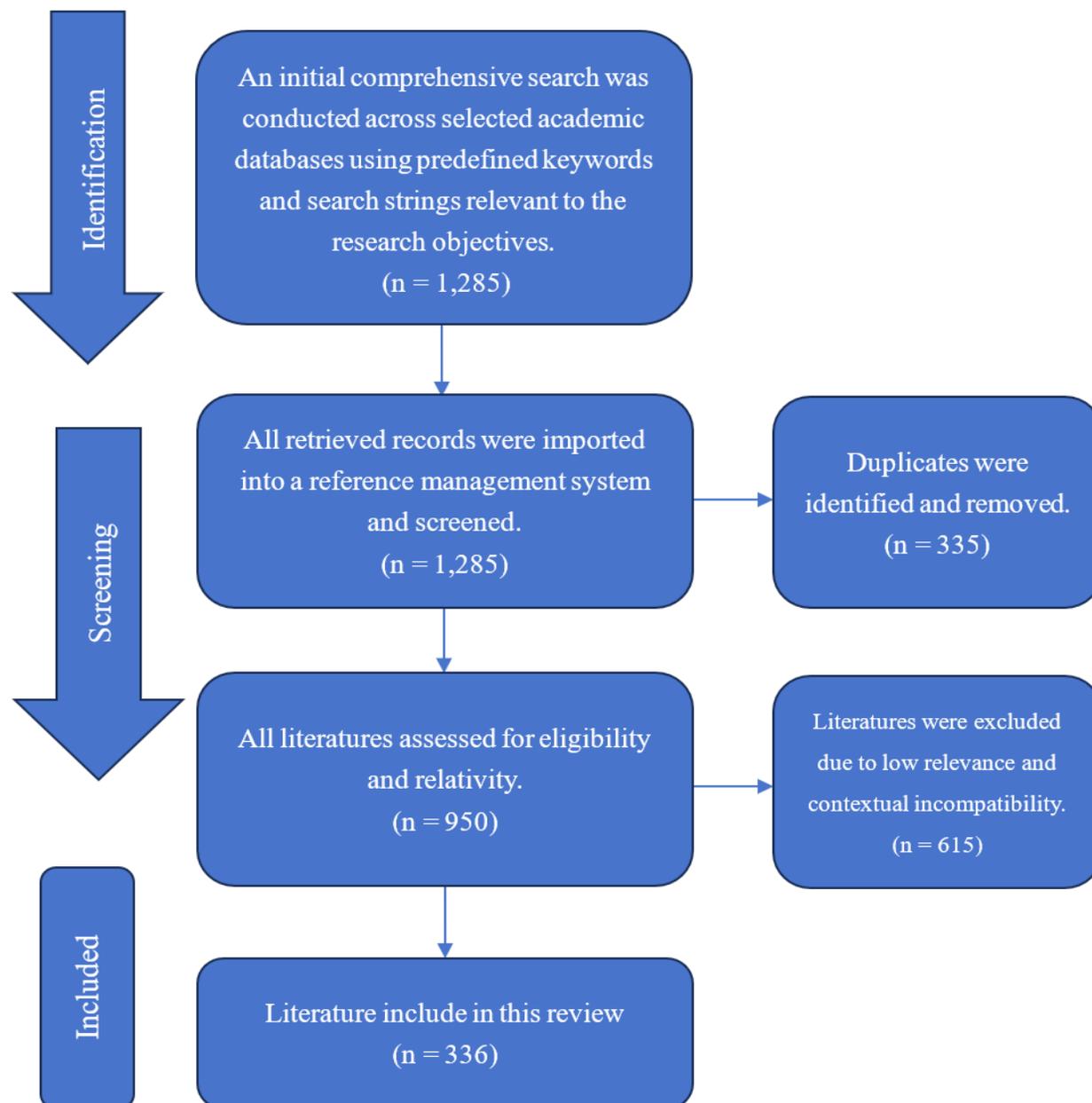


Figure 1.
PRISMA flow map.

A multilingual search strategy was employed to capture both global and context-specific evidence. English-language studies were retrieved from Web of Science (Core Collection) and Scopus, while Chinese-language studies were sourced from China National Knowledge Infrastructure (CNKI) to

reduce language bias and incorporate indigenous perspectives relevant to the Chinese context (e.g., *guanxi* and political embeddedness). To ensure comparability with international SSCI/SCI standards, CNKI searches were restricted to journals indexed in CSSCI, CSCD, the Beida Core Journal List, and the AMI Comprehensive Evaluation Report. Also, only peer-reviewed journal articles were included; conference proceedings, book chapters, editorials, and non-refereed publications were excluded. Eligible studies were required to empirically examine the relationship between green organizational practices and performance outcomes; purely conceptual studies were excluded. No formal start year was imposed, with the effective search window spanning 2000 to the present.

The selection process followed a PRISMA workflow. The initial search identified 1,285 records (714 from Web of Science, 446 from Scopus, and 125 from CNKI). After duplicate removal, 950 records were screened by title and abstract, followed by full-text assessment. This process yielded 336 empirical studies for qualitative synthesis. Data were systematically extracted on theoretical frameworks, mediating mechanisms, moderating conditions, and methodological features. A thematic analysis was conducted to synthesize dominant transmission mechanisms and boundary conditions, enabling the development of an integrated framework explaining how and under what conditions green organizational practices influence performance outcomes.

Table 1.
Summary of the search strategy.

Methodological Component	Description
Review Design	Systematic literature review conducted in accordance with the PRISMA guidelines to ensure transparency, rigor, and replicability.
Search Strategy	Multilingual database search designed to capture both international and Chinese-context evidence. English-language studies were retrieved from Web of Science (Core Collection) and Scopus; Chinese-language studies were retrieved from CNKI to incorporate indigenous mechanisms (e.g., <i>guanxi</i> , political embeddedness) and reduce language bias.
Quality Control for Chinese Sources	CNKI results were restricted to journals indexed in CSSCI, CSCD, Beida Core, and AMI to ensure comparability with international SSCI/SCI journals.
Document Type Criteria	Inclusion limited to peer-reviewed journal articles; conference papers, book chapters, editorials, and non-refereed publications were excluded.
Language Criteria	Both English- and Chinese-language empirical studies were included to address the Chinese institutional context and capture theoretical applications rarely published in international outlets.
Relevance Criteria	Studies were required to empirically examine the relationship between green organizational practices and performance outcomes; purely conceptual studies without data were excluded.
Time Frame	Studies published between 2000 and the present were considered to capture the evolution of the field.
Initial Search Yield	1,285 records identified (Web of Science: 714; Scopus: 446; CNKI: 125).
Screening Process	After duplicate removal, 950 unique records were screened by title and abstract; non-relevant studies were excluded.
Final Sample	336 empirical studies were retained following full-text eligibility assessment.
Data Extraction	Information extracted on theoretical frameworks, mediating mechanisms, moderating conditions, and methodological characteristics.
Analytical Approach	Thematic synthesis is used to aggregate mediators into higher-order mechanisms and classify boundary conditions across organizational, contextual, and individual levels.

3. Results and Findings

Following duplicate removal, 950 records were screened based on titles and abstracts, resulting in a final sample of 336 empirical studies included in the systematic review. To ensure temporal comparability, descriptive analyses focus on complete publication years from 2000 to 2025; studies published in early 2026 ($n = 5$) were incorporated into the qualitative synthesis but excluded from annual trend visualization to avoid distortion caused by incomplete data.

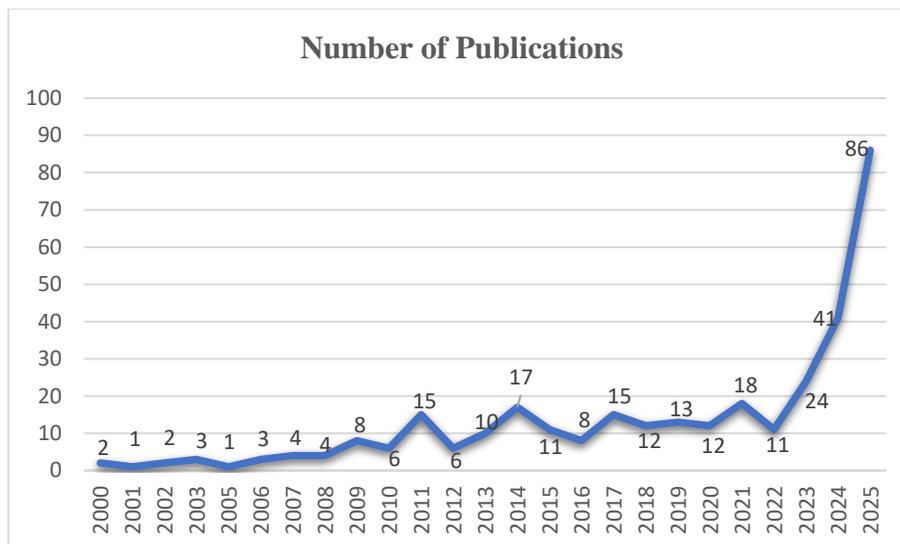


Figure 2.
Number of publications in years.

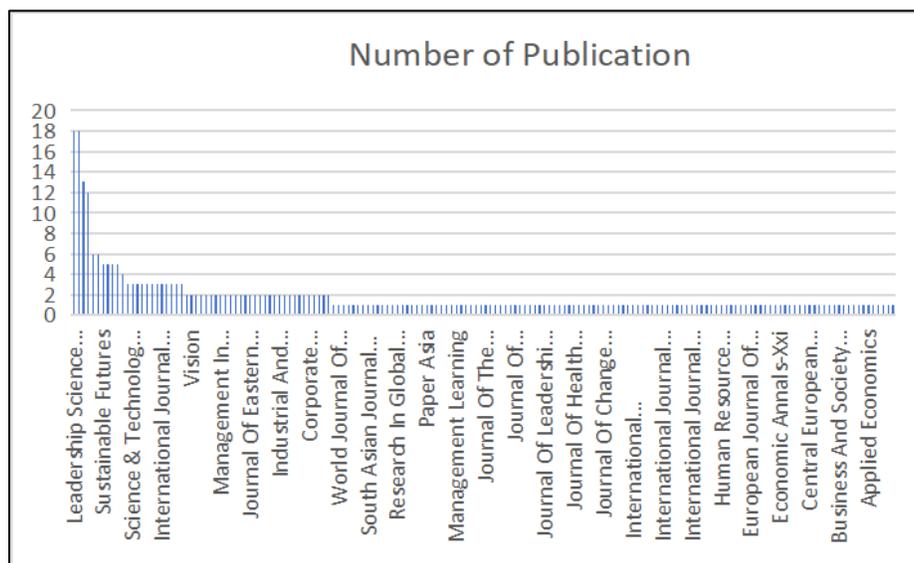
Analysis of the temporal distribution reveals a clear evolutionary trajectory of the field. Of the 336 studies, 264 (78.6%) were published in international English-language journals and 72 (21.4%) in leading Chinese-language journals. As illustrated in Figure 2, research output has increased exponentially over time and can be broadly divided into three phases. The incubation phase (2000–2010) was characterized by sporadic publications and a focus on regulatory compliance and technical environmental practices. This was followed by a steady growth phase (2011–2020), during which scholars increasingly linked environmental management to organizational strategy and competitive advantage. Since 2021, the field has entered a period of exponential proliferation, peaking in 2024–2025. This surge reflects the convergence of global sustainability imperatives, particularly the UN Sustainable Development Goals, and domestic policy drivers such as China’s “Dual Carbon” targets announced in late 2020, which stimulated a wave of indigenous research.

Table 2.

Leading journals in the sample.

Journals	Numbers
Leadership Science (Lingdao Kexue)	18
Journal Of Cleaner Production	18
Business Strategy and The Environment	13
Journal Of Business Ethics	12
Leadership And Organization Development Journal	6
Corporate Social Responsibility and Environmental Management	6
Sustainable Futures	5
Social Responsibility Journal	5
Journal Of Global Responsibility	5
Environment, Development and Sustainability	5
Business Ethics, The Environment and Responsibility	4

The reviewed studies were published across a wide range of academic journals, reflecting the multidisciplinary nature of the field. The journal distribution exhibits a pronounced long-tail pattern, with a core group of high-impact outlets anchoring the literature and a broad dispersion across specialized domains (Figure 3). Notably, Leadership Sciences (Lingdao Kexue) and the Journal of Cleaner Production jointly rank as the most frequent outlets, followed by Business Strategy and the Environment and the Journal of Business Ethics. This balance between leading Chinese- and English-language journals highlights the parallel advancement of the field across indigenous leadership scholarship and global sustainability research. Consistent with Bradford's Law of Scattering (Bradford, 1934), the concentration of publications in Q1 and Tier-1 journals, alongside wide disciplinary diffusion, underscores both the maturity and cross-disciplinary relevance of green organizational practices and sustainable leadership.

**Figure 3.**

Distribution of publications.

3.1. Finding One to Reach the First Objective: To Develop a Theoretical Foundation that Explains When and How Green Organizational Practices Translate into Sustainable Performance in the Chinese Context

Building on the systematic review, the findings indicate that the relationship between green organizational practices and sustainable performance cannot be adequately explained through a single theoretical lens. Instead, the literature converges on a multi-theoretic foundation in which

complementary perspectives operate at different levels of analysis. As classified by the authors, the reviewed studies cluster around four dominant theoretical perspectives: a resource perspective grounded in the Resource-Based View (RBV) and the Natural Resource-Based View (NRBV), which emphasizes internal assets and capabilities; an external and legitimacy perspective informed by institutional and stakeholder theories, which highlights regulatory, normative, and social pressures; a strategic leadership perspective rooted in Upper Echelons Theory (UET), which foregrounds leadership cognition and strategic choice; and a relational and psychological perspective drawing on Social Exchange Theory (SET), which explains employee reciprocity and motivation. Together, these perspectives provide an integrated explanation of how green practices are developed, legitimized, enacted, and internalized.

Within this broader framework, RBV and NRBV emerge as the most frequently employed lenses, accounting for approximately 35% of the reviewed studies. Consistent with Barney's [14] conceptualization of valuable, rare, inimitable, and non-substitutable (VRIN) resources, green organizational practices are commonly treated as strategic assets capable of generating sustained competitive advantage [14]. In particular, complex systems such as green supply chains, environmental management routines, and sustainability-oriented organizational cultures create causal ambiguity and path dependence, limiting imitation by competitors. Extending this internal logic, Hart [6] NRBV explicitly incorporates environmental constraints, identifying pollution prevention, product stewardship, and sustainable development as key strategic capabilities. Empirical applications of these perspectives predominantly focus on innovation- and capability-based mechanisms. Across the reviewed studies, investments in green technologies, patents, and process innovations are shown to accumulate as green intellectual capital that enhances operational efficiency and environmental performance [15]. In parallel, green practices strengthen corporate reputation as an intangible resource, thereby linking environmental responsibility to financial and competitive outcomes. However, despite their explanatory strength, RBV and NRBV are often criticized for their relatively static orientation: while they clarify what resources matter, they offer limited insight into how such resources are mobilized, coordinated, and sustained over time. This limitation underscores the need to incorporate complementary perspectives that address implementation dynamics.

Addressing this gap, institutional and stakeholder theories shift analytical attention from internal capabilities to external legitimacy pressures, accounting for approximately 25% of the reviewed studies. From an institutional perspective, organizations adopt green practices not only for efficiency but also to conform to socially constructed expectations and secure legitimacy [16]. The reviewed literature consistently identifies coercive pressures from environmental regulation, mimetic pressures arising under competitive uncertainty, and normative pressures embedded in professional standards. Stakeholder theory further refines this explanation by emphasizing firms' responsiveness to multiple stakeholder groups, including regulators, customers, employees, investors, and communities [7]. Importantly, these external logics take on distinctive characteristics in the Chinese context. Numerous studies frame green organizational practices as mechanisms for achieving political legitimacy and alignment with the state's ecological civilization agenda [10]. Such alignment influences organizations' access to subsidies, land, financing, and regulatory support [11, 17]. Over time, repeated exposure to institutional and stakeholder expectations facilitates a shift from symbolic compliance to substantive implementation, as external pressures gradually reshape internal norms, routines, and organizational identity. Standards such as ISO 14001 function simultaneously as external legitimacy signals and internal sensemaking devices, while practices such as green HRM and green supply chain management translate stakeholder demands into operational routines.

While institutional and stakeholder perspectives explain why organizations adopt green practices, they provide limited insight into why similar pressures produce divergent outcomes across firms. This variation is addressed by the strategic leadership perspective grounded in upper echelons theory. UET posits that strategic choices reflect top managers' cognitive bases, values, and interpretations [18], positioning leadership as a critical boundary condition in the sustainability-performance relationship. Across the reviewed studies, leaders' environmental orientation consistently shapes how green

initiatives are framed, prioritized, and resourced. Leaders who interpret environmental challenges as strategic opportunities are more likely to commit organizational attention and resources, thereby increasing the likelihood that green practices translate into substantive performance gains. Moreover, this leadership influence cascades through organizational hierarchies, as middle managers interpret strategic intent and translate it into operational routines, determining whether green initiatives become embedded practices or remain symbolic. In the Chinese context, this leadership logic is frequently extended through a relational channel. Several studies highlight leaders' *guanxi* (social connection) ties with local officials as a mechanism for reducing institutional uncertainty and facilitating coordination with regulatory actors [12, 19]. Through these ties, leaders not only shape internal interpretations but also mediate external constraints, enabling green organizational practices to be implemented more effectively. Taken together, this perspective suggests that sustainable leadership in China operates through a combination of cognitive framing and relational coordination, linking internal capabilities with external legitimacy.

3.2. Finding Tow to Reach the Second Objective: To Understand Which Theoretical Perspectives Dominate the Field, Identify the Capability-Based and Psychological Mechanisms that Drive Performance

To clarify through which mechanisms green organizational practices influence sustainable performance, the study conducted a thematic analysis of mediating variables identified in the reviewed literature. After excluding entries labeled “None” or “Not Specified,” a total of 66 distinct mediating mechanisms were identified. To enhance analytical clarity, these mechanisms were grouped into four meta-categories according to their underlying theoretical logic. As aforementioned, the distribution across categories is remarkably balanced, indicating that the green practice–performance relationship is inherently multifaceted, driven by interacting psychological, cultural, capability-based, and innovation-oriented forces rather than a single dominant pathway.

Specifically, the most prominent category comprises Psychological and Attitudinal Mechanisms (N = 18, 27%), which capture individual-level variables such as psychological safety, organizational commitment, engagement, and identification. This cluster highlights employee mindset and intrinsic motivation as foundational “soft” drivers of sustainability outcomes. Closely following are Innovation and Transformation Mechanisms (N = 17, 26%), which shift the analytical focus from individual attitudes to organizational action and strategic change. Variables such as green innovation, green creativity, and digital transformation dominate this category, suggesting that sustainable performance is frequently realized through concrete processes of transformation. The third category, Knowledge and Organizational Capability Mechanisms (N = 16, 24%), emphasizes the role of intangible resources, including organizational learning, knowledge management, and green structural capital, underscoring the importance of cognitive and informational infrastructure. Finally, Green Culture, Identity, and Climate Mechanisms (N = 15, 23%) address the broader organizational environment, highlighting how shared values, norms, and identity function as the contextual “soil” that enables green practices to take root and endure.

Building on these findings, the review synthesizes the four thematic categories into two analytically distinct but interrelated pathways. First, the capability pathway integrates innovation- and knowledge-based mechanisms, emphasizing tangible assets, technical competencies, and operational efficiency. Second, the cultural and psychological pathway integrates psychological and cultural mechanisms, focusing on intangible assets such as values, norms, and employee motivation. Importantly, the literature consistently shows that the influence of green organizational practices on performance is rarely direct; instead, outcomes emerge through the dynamic interaction of these two pathways.

Within the capability pathway, a substantial portion of the literature, approximately 40%, identifies green innovations as the primary conduit linking green practices to performance. Studies grounded in the Resource-Based View argue that practices such as green training and green supply chain management do not generate performance outcomes directly but instead create conditions conducive to innovation. Green innovation is typically differentiated into process innovation and product innovation,

each operating through distinct value-creation logics. Process innovation enhances eco-efficiency by reducing waste and emissions, thereby simultaneously lowering costs and environmental impact [20, 21]. Product innovation, by contrast, operates through market differentiation, as green practices signal strategic priorities to R&D teams and encourage eco-design, resulting in differentiated offerings that command price premiums and strengthen competitive advantage [22].

Beyond discrete innovations, recent studies emphasize green dynamic capabilities, defined as the organizational ability to integrate, build, and reconfigure internal competencies. Empirical evidence suggests that Green HRM practices foster cumulative stocks of environmental knowledge, enabling firms to sense market shifts and seize green opportunities more rapidly [23, 24]. In this logic, knowledge management functions as the central mechanism: green practices generate knowledge, knowledge enhances agility, and agility ultimately translates into sustainable performance.

Complementing the capability pathway, the cultural and psychological pathway explains how green practices shape meaning, norms, and motivation, thereby determining whether sustainability goals are enacted in everyday work. Green Organizational Culture (GOC) emerges as a particularly influential mediator. Drawing on Schein's framework, GOC is defined as a system of shared values and beliefs concerning environmental responsibility. Recent empirical studies in 2025 demonstrate that green practices and leadership jointly cultivate such cultures, which subsequently function as "social glue" guiding employee behavior and enhancing environmental performance [25]. This mechanism is especially salient in the Chinese context, where collectivism and Daoist philosophy strongly influence organizational life. Indigenous studies highlight how GOC often reflects the Daoist principle of *Tian Ren He Yi* (harmony between humanity and nature), reframing environmental responsibility as moral alignment rather than cost burden [26].

At the individual level, the literature extensively employs Social Exchange Theory and Social Identity Theory to explain the micro-foundations of sustainability. Green practices reshape how employees define their relationship with the organization, strengthening organizational identification and internalization of green values. For example, Pan et al. [27] show that environmental leadership fosters a strong green organizational identity, which in turn enhances motivation for creative problem-solving and green innovation [27]. These psychological states translate into behavior primarily through Green Organizational Citizenship Behavior (OCB-E), discretionary actions such as conserving energy or proposing eco-friendly workflows. By increasing trust and perceived organizational support, green practices encourage employees to exceed formal role requirements, with individual behaviors aggregating into firm-level performance outcomes. Notably, the prominence of this pathway aligns closely with the Chinese cultural emphasis on harmony (*He* in Chinese) and collective identity, rendering normative influence more effective than formal controls alone.

Importantly, recent studies increasingly emphasize that these two pathways do not operate in isolation but instead reinforce one another. Empirical evidence shows that innovation outcomes are contingent upon a supportive culture and leadership. Chen et al. [28] distinguish between proactive and reactive green innovation, demonstrating that internal drivers, particularly environmental leadership and culture, exert stronger effects than external pressure alone [28]. Other studies specify sequential chains linking intangible resources to innovation capability. For instance, Nguyen-Van et al. [29] identify a serial mechanism in which leadership builds green intellectual capital, which then enables ambidextrous innovation and, ultimately, sustainable performance [29]. This integrative logic is especially pronounced in SMEs, where Tariq et al. [30] show that green organizational culture and green innovation function as simultaneous engines of growth, coordinated by sustainable leadership [30]. Qualitative evidence from Siam Cement Group further corroborates this holistic model, illustrating how strong organizational culture and strong innovation co-evolve under a sustainable leadership framework [31].

Taken together, the reviewed evidence suggests that underperformance in sustainability initiatives often reflects imbalance rather than absence. Firms that invest heavily in technical tools without cultivating supportive culture and motivation struggle with implementation, while those that build

strong values but underinvest in capability and innovation fail to realize performance gains. Sustainable performance, therefore, emerges most reliably when capability-based and cultural-psychological mechanisms operate in concert.

3.3. Finding Three to Reach the Third Objective: To Determine How Sustainable Leadership Functions as a Boundary Condition

To determine how sustainable leadership functions as a boundary condition, this part examines when and under what conditions green organizational practices most effectively translate into sustainable leadership performance. The synthesis clearly demonstrates that these relationships are not universal; rather, they are highly contingent on multi-level moderating factors that shape the strength and direction of green practice–performance linkages.

As summarized in Figure 4, the identified moderators cluster into organizational, contextual, and individual levels, with the organizational level accounting for approximately 60% of all moderated relationships. This dominant pattern underscores a central insight: while external pressures and employee characteristics matter, the internal managerial environment, particularly leadership, acts as the primary switch that activates or suppresses the effectiveness of green strategies. In other words, the “tone at the top” determines whether green practices remain symbolic or become performance-enhancing.

At the organizational level, sustainable leadership emerges not merely as an antecedent but as a critical amplifier of green practices. Consistent with upper echelons theory, the findings indicate that although green practices reflect top management values, their successful enactment depends on leaders’ visible commitment and active involvement. This contingency is especially pronounced in the Chinese context. In a high power-distance society shaped by paternalistic leadership norms, leaders are widely viewed as moral exemplars. Consequently, a leader’s explicit sustainability orientation provides essential legitimacy for green initiatives, making leadership a particularly powerful catalyst in Chinese firms.

Within this leadership cluster, environmental leadership (N = 21) and green transformational leadership (N = 17) are the most frequently examined moderators. The literature converges on two reinforcing mechanisms. First, through a strategic signaling effect, leaders communicate the seriousness of environmental commitments. Robinson et al. [32] show that actions such as articulating a green vision or pursuing recognitions like DJSI membership send credible signals to employees, reducing role ambiguity and reframing Green HRM from bureaucratic compliance into a strategic priority [32]. This signaling directly strengthens the cultural and psychological pathway. Second, through behavioral role-modeling, leaders set normative standards. Empirical evidence from Sikand and Saxena [33] confirms that visible pro-environmental behaviors by leaders significantly enhance employees’ discretionary green actions, reinforcing the principle that actions outweigh formal policies [33].

Beyond behavioral influence, leadership also moderates outcomes through resource orchestration. The review reveals a clear distinction based on organizational size and resource endowment. In large firms, slack resources (N=5) buffer the costs of environmental transition, strengthening the green innovation–performance link. In contrast, within resource-constrained SMEs, entrepreneurial bricolage (N=5) plays a decisive role. Iqbal et al. [34] demonstrate that leaders’ ability to creatively recombine existing resources can compensate for material scarcity, enabling sustainable outcomes despite limited asset bases [34].

At the contextual level, external institutional forces further condition performance effects. Industry sensitivity (N = 8) differentiates the dominant drivers across sectors. In high-polluting industries, intense stakeholder scrutiny amplifies the returns to substantive green initiatives, as firms seek legitimacy through genuine environmental improvements rather than symbolic actions [35]. In contrast, service industries are more strongly moderated by customer demand, where the financial payoff of green practices depends on whether sustainability is valued by target markets. Additionally, technological turbulence (N = 4) and regulatory uncertainty (N = 4) function as amplifiers, consistent

with the dynamic capabilities perspective: under volatile conditions, green innovation becomes a critical adaptive capability that differentiates high-performing firms.

Although less frequently examined, individual-level moderators provide important micro-foundations grounded in Social Exchange Theory. Value congruence emerges as a key condition. Asante [36] shows that green leadership yields stronger outcomes when employees' personal environmental values align with organizational goals, suggesting that top-down mandates alone are insufficient without intrinsic motivation [36]. Similarly, psychological empowerment (N = 3) conditions innovation outcomes: green practices stimulate creativity only when employees perceive autonomy and capability, reinforcing the importance of empowerment over mere compliance.

Synthesizing these findings, the review advances a “Catalytic Model” of Sustainable Leadership. Rather than treating leadership and green practices as isolated antecedents, the evidence supports an interactive logic in which Sustainable Leadership functions as the primary catalyst. Leadership simultaneously fuels the capability pathway by enabling risk-taking and resource allocation, and energizes the cultural and psychological pathway through vision, legitimacy, and role modeling. Conceptually, Green Organizational Practices operate as the organizational “engine,” while Sustainable Leadership provides the essential “fuel.” Without this catalytic fuel, the engine remains underutilized. This interaction offers a compelling explanation for inconsistencies in prior findings: studies that overlook leadership as a moderating force are likely to underestimate the true performance potential of green practices.

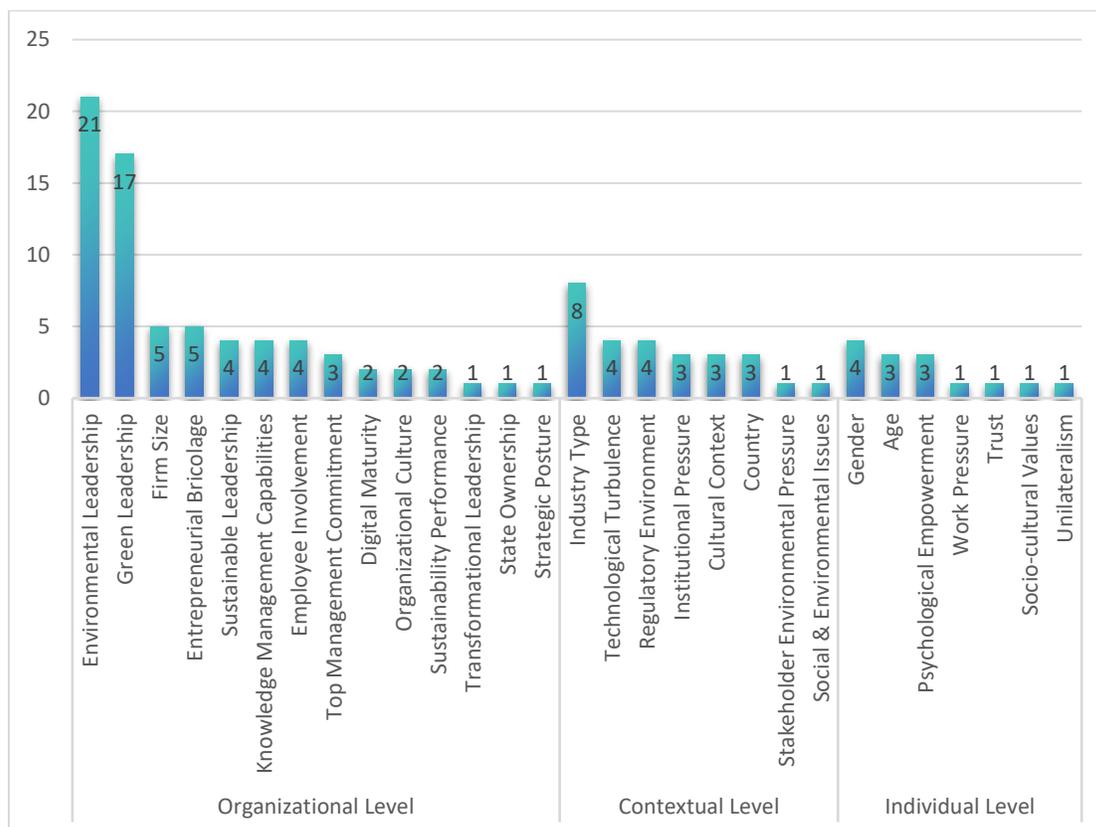


Figure 4. Conceptual Classification of Moderating Variables.

4. Discussion and Implications

Our systematic review aimed to unpack the “black box” connecting green organizational practices to sustainable performance. By synthesizing data from 336 studies, the study has mapped a complex ecosystem driven by four theoretical pillars, mediated through multi-dimensional mechanisms, and critically bounded by leadership dynamics.

Contrary to the techno-centric view that sustainable performance is solely a technical outcome of adopting green tools, our findings characterize it as a robust socio-technical process. The integration of our findings (see Figure 5) supports a *Catalytic Model*: green organizational practices serve as the organizational “Engine” (providing the necessary operational changes), while sustainable leadership acts as the crucial “Fuel.” Without the cognitive and resource-based support of leaders, the engine remains idle. Furthermore, this process relies on a *Dual-Pathway* transmission, where technical capabilities and psychological engagement must function rather than in isolation.

This systematic review aimed to unpack the long-standing “black box” linking green organizational practices to sustainable performance. By synthesizing evidence from 336 empirical studies, the review reveals that sustainability outcomes do not arise from isolated practices or technical adoption alone. Instead, they emerge from an interdependent organizational ecosystem, structured around four complementary theoretical pillars, transmitted through multi-layered mechanisms, and decisively shaped by leadership-related boundary conditions.

In contrast to techno-centric perspectives that frame sustainability as a direct function of green tools or environmental technologies, the accumulated evidence characterizes sustainable performance as a socio-technical process. Also, the findings converge on a *Catalytic Model* in which Green Organizational Practices operate as the organizational *engine*, introducing formal structures, routines, and technologies, while Sustainable Leadership functions as the *fuel* that activates, directs, and sustains this engine. Without leadership commitment, cognitive framing, and resource orchestration, green practices remain operationally present but strategically inert.

Crucially, this catalytic process unfolds through a dual-pathway transmission mechanism. On the one hand, green practices build technical and organizational capabilities that improve efficiency, innovation, and compliance. On the other hand, they reshape employee meanings, identities, and motivations, generating psychological engagement and discretionary pro-environmental behavior. The review demonstrates that these pathways are not substitutes; rather, they must function in concert. Sustainable performance materializes only when technical capability development is matched by cultural alignment and psychological ownership.

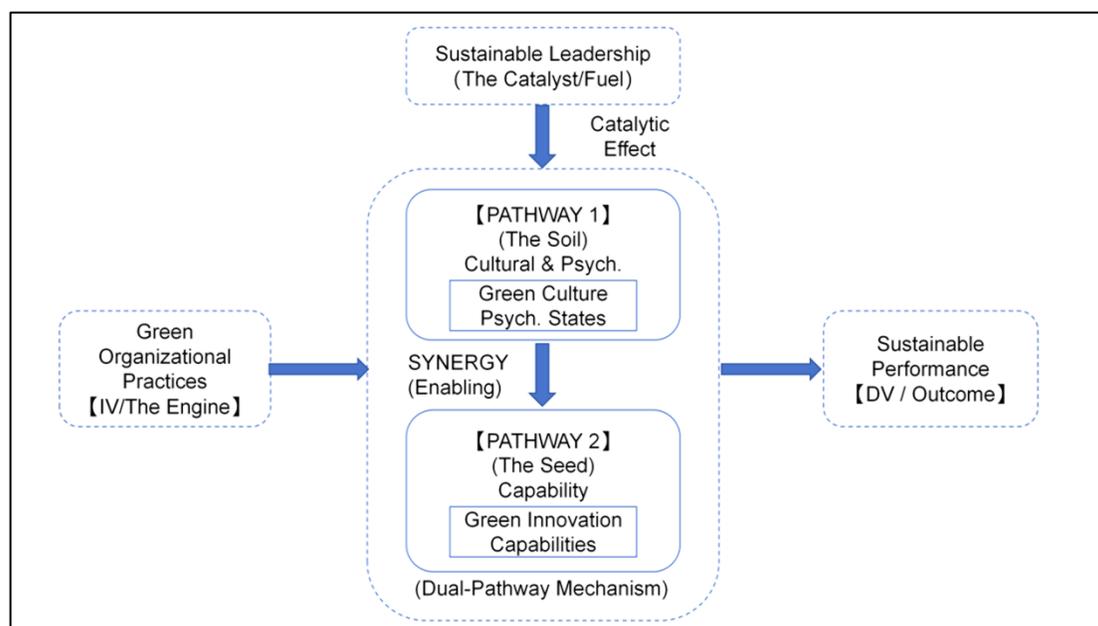


Figure 5. The Catalytic Model: An Integrated Framework of Green Organizational Practices, Sustainable Leadership, and Sustainable Performance.

4.1. Theoretical Implications

Taken together, the findings of this review make a substantive theoretical contribution by addressing the long-standing fragmentation in sustainability scholarship. Prior research has often examined green organizational practices through isolated theoretical lenses, leading to partial explanations that privilege either resources, institutions, leadership, or employee psychology. By contrast, the present synthesis demonstrates that no single framework is sufficient to explain when and how green practices translate into sustainable performance. Instead, the evidence points to the necessity of multi-theoretic integration across organizational levels.

At the organizational level, the integration of the Resource-Based View (RBV) with Institutional Theory clarifies an important dual logic underlying green practices. On the one hand, firms leverage green resources, such as environmental technologies, green routines, and organizational capabilities, as sources of efficiency, innovation, and long-term competitive advantage. On the other hand, these same practices operate as legitimacy-seeking responses to regulatory mandates, normative expectations, and stakeholder scrutiny. The reviewed studies consistently show that sustainable leadership performance emerges not simply because firms possess green resources, but because these resources are strategically mobilized to satisfy both internal efficiency demands and external legitimacy pressures. This insight helps reconcile contradictory findings in prior work, where green practices appeared beneficial in some contexts but ineffective in others.

Equally important, the review bridges macro-level strategy with micro-level behavior by integrating upper echelons theory (UET) and social exchange theory (SET). While UET explains how leaders' values and cognitive frames shape strategic priorities, SET elucidates how employees interpret these signals and reciprocate through engagement, commitment, and discretionary behavior. The accumulated evidence indicates that leadership intent does not translate automatically into performance; rather, it is filtered through employees' perceptions of support, fairness, and authenticity. This cross-level linkage advances sustainability theory by explicitly tracing how strategic orientation at the top becomes operationalized through everyday employee actions.

A second major theoretical implication concerns the validation of a dual-pathway transmission mechanism. The review moves beyond the traditional dichotomy between innovation-driven and culture-driven explanations by demonstrating that green practices operate simultaneously through a capability-based pathway and a cultural–psychological pathway. The capability pathway explains how green practices foster innovation, knowledge accumulation, and dynamic capabilities that enhance operational and financial performance. In parallel, the cultural and psychological pathway explains how shared values, organizational identification, and trust give rise to pro-environmental behaviors such as OCB-E.

Crucially, the evidence suggests that these pathways are interdependent rather than parallel. Cultural and psychological mechanisms frequently emerge as necessary antecedents that condition whether capability investments yield tangible outcomes. In other words, technical capability without cultural alignment often results in symbolic adoption, while cultural commitment without technical infrastructure limits scalability and impact. This synergistic logic provides a robust explanation for the mixed and sometimes contradictory findings reported in earlier studies, suggesting that inconsistent results may reflect imbalanced implementation rather than theoretical flaws.

Finally, the review makes a decisive contribution by repositioning sustainable leadership as the dominant boundary condition shaping the effectiveness of green practices. Drawing on UET, the evidence overwhelmingly indicates that leadership-related moderators outweigh contextual and individual factors. This pattern underscores that sustainability outcomes are not universal or automatic; they are deeply contingent on how leaders interpret environmental challenges, prioritize competing demands, and allocate scarce resources. In doing so, the review shifts the theoretical conversation from a narrow focus on what practices organizations should adopt to a more fundamental concern with who leads these practices and how they are enacted. Sustainable leadership thus emerges not as a supplementary factor but as the central interpretive and catalytic force within the sustainability ecosystem.

4.2. Practical Implications

The findings of this review carry significant implications for organizational leaders and policymakers by reframing sustainability as a leadership-driven, system-level transformation rather than a technical compliance exercise. For top management, the evidence clearly indicates that green transitions cannot be effectively delegated to specialized units such as HR, sustainability offices, or operations departments. Instead, sustainability must be embedded within executive governance and strategic decision-making. Boards and senior executives are therefore encouraged to treat sustainability-related competencies, such as long-term orientation, environmental values, and systems thinking, as core leadership attributes rather than peripheral concerns.

This insight is particularly salient in high power-distance contexts such as China, where leaders are culturally positioned as moral exemplars. In such environments, employees closely observe leadership behavior to infer organizational priorities. The reviewed studies consistently show that symbolic commitment or rhetorical endorsement of sustainability is insufficient. Leaders must visibly role-model green behaviors and consistently align resource allocation with sustainability goals. When leadership actions and organizational rhetoric are congruent, green initiatives gain legitimacy and credibility, significantly enhancing employee engagement and collective commitment.

The implications extend beyond senior leadership to middle managers, who function as critical translators between strategic intent and operational reality. The evidence suggests that a purely technocratic approach, focused on implementing environmental systems or performance indicators, often fails when not accompanied by cultural and psychological groundwork. Middle managers are therefore advised to adopt a sequenced implementation logic, prioritizing trust-building, psychological safety, and shared green identity before deploying complex technical solutions. When employees perceive green initiatives as meaningful and supportive rather than coercive, they are more likely to engage in discretionary behaviors that amplify the impact of technical investments.

From a policy perspective, the findings caution against uniform regulatory strategies. The effectiveness of policy instruments varies substantially across industries and institutional contexts. In high-polluting sectors, coercive pressures such as stringent standards and enforcement mechanisms remain powerful drivers of substantive change. Conversely, in service-oriented and consumer-facing industries, normative pressures, such as certification schemes, public disclosure, and consumer awareness initiatives, play a more influential role by shaping market demand and reputational incentives. Policymakers are therefore encouraged to adopt differentiated, context-sensitive approaches that align regulatory instruments with industry characteristics and organizational realities.

4.3. Limitations and Directions for Future Research

Despite the breadth of this review, several gaps in the literature warrant attention. First, dominant theories such as RBV and SET, while influential, often lack the granularity needed to capture nuanced tensions. Future research could draw on Paradox Theory to examine how leaders navigate competing demands between profitability and environmental responsibility, or on Signaling Theory to analyze how green practices reduce information asymmetry in labor and capital markets.

Second, the review reveals a pronounced gap at the individual level. While leadership has been extensively examined, employee demographics and value heterogeneity remain underexplored. Future studies should investigate whether generational cohorts respond differently to Green HRM, especially given the increasing environmental salience among younger workers.

Third, the field would benefit from greater attention to cross-level interactions. Multi-level modeling approaches could illuminate whether strong internal leadership resources buffer adverse regulatory environments or amplify institutional pressures.

Ultimately, the prevalence of cross-sectional designs hinders causal inference. Longitudinal studies are urgently needed to test the temporal logic implied by the Dual-Pathway model, specifically, whether cultural and psychological foundations must precede and enable capability development over time.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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