
Navigating Paradox for Sustainable Futures: Organizational Capabilities and Integration Mechanisms in Sustainability Transformation

[Jonathan H. Westover](#)*

Posted Date: 22 July 2025

doi: 10.20944/preprints202506.2482.v3

Keywords: sustainability transformation; paradox navigation; organizational capabilities; integration mechanisms; power dynamics; organizational learning; sustainable development; corporate sustainability; systems thinking



Preprints.org is a free multidisciplinary platform providing preprint service that is dedicated to making early versions of research outputs permanently available and citable. Preprints posted at Preprints.org appear in Web of Science, Crossref, Google Scholar, Scilit, Europe PMC.

Copyright: This open access article is published under a Creative Commons CC BY 4.0 license, which permit the free download, distribution, and reuse, provided that the author and preprint are cited in any reuse.

Disclaimer/Publisher's Note: The statements, opinions, and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions, or products referred to in the content.

Article

Navigating Paradox for Sustainable Futures: Organizational Capabilities and Integration Mechanisms in Sustainability Transformation

Jonathan H. Westover

Western Governors University; jon.westover@gmail.com

Abstract

This study investigates the critical capabilities and integration mechanisms that enable organizations to achieve substantive sustainability transformations. Using a mixed-methods approach combining survey data (n=234), in-depth interviews (n=42), and comparative case studies (n=6), the research identifies how organizations effectively navigate sustainability paradoxes while developing integration practices that embed sustainability throughout organizational systems. Our research is primarily grounded in paradox theory, complemented by insights from organizational learning theory, institutional logics, and power dynamics perspectives to develop a comprehensive theoretical framework. Statistical analysis reveals strong relationships between paradox navigation capabilities and transformation outcomes ($\beta=0.31$, $p<0.01$), with integration practices emerging as the strongest predictor of sustainability success ($\beta=0.42$, $p<0.01$). Qualitative findings illuminate four essential integration mechanisms—governance integration, strategic integration, operational integration, and performance integration—and their temporal development. The significant interaction between power mobilization and integration practices ($\beta=0.19$, $p<0.01$) demonstrates that structural interventions are insufficient without attention to power relationships. The research contributes to sustainability science by advancing theory on paradoxical tensions in transformation processes, demonstrating how organizations can transcend the gap between sustainability rhetoric and substantive action through both structural integration and power-conscious approaches. By identifying contextual contingencies across sectors and organizational types, the study challenges universal prescriptions for sustainability transformation, offering instead a nuanced framework for creating organizational conditions conducive to context-specific transformation toward more sustainable futures. Our findings offer practical guidance for organizations navigating the complex landscape of sustainability transformation and contribute to the implementation of UN Sustainable Development Goals, particularly SDG 12 (Responsible Consumption and Production) and SDG 17 (Partnerships for the Goals).

Keywords: sustainability transformation; paradox navigation; organizational capabilities; integration mechanisms; power dynamics; organizational learning; sustainable development; corporate sustainability; systems thinking

1. Introduction

The global sustainability crisis requires profound transformations in how organizations operate, with growing recognition that incremental approaches are insufficient to address mounting environmental and social challenges [1, 2]. Despite increasing commitment to sustainability among organizations across sectors, a persistent gap remains between sustainability aspirations and substantive action [3, 4]. This gap presents both a practical problem and a theoretical puzzle: why do organizations struggle to translate sustainability commitments into transformative change, and what capabilities and mechanisms enable some organizations to overcome these challenges?

This research addresses this puzzle by investigating how organizations bridge the sustainability rhetoric-action gap through developing specific capabilities and integration mechanisms that enable substantive transformations. We move beyond existing research that has identified this gap [5, 6] to examine the specific organizational practices and contextual conditions that allow organizations to overcome it.

Our study is primarily grounded in paradox theory [7], which provides a powerful lens for understanding how organizations navigate the competing yet interdependent demands inherent in sustainability transformation. We complement this with insights from organizational learning theory [8], institutional logics [9], and power dynamics [10] to develop a comprehensive theoretical framework that explains the capabilities and mechanisms facilitating substantive sustainability transformations.

Our theoretical framework also draws on systems thinking [11] to conceptualize sustainability transformation as a complex adaptive system where capabilities and mechanisms interact dynamically rather than linearly. As Wang and Zhang [12] demonstrate in their work on digital transformation, viewing organizational elements as an integrated system where components interact synergistically produces more robust outcomes than addressing elements in isolation. Following this perspective, we conceptualize our four integration mechanisms (governance, strategic, operational, and performance) as interconnected subsystems within a larger organizational system, where changes in one subsystem necessarily affect others through feedback loops, emergent properties, and non-linear interactions. This systems view helps explain why piecemeal sustainability initiatives often fail to produce substantive transformation, while integrated approaches that consider whole-system dynamics tend to generate more significant outcomes.

Within this systems framework, organizational capabilities for paradox navigation, power mobilization, and learning function as dynamic capacities that enable the system to adapt and evolve in response to both internal tensions and external pressures. The effectiveness of these capabilities is moderated by contextual factors, including regulatory environments and inter-organizational relationships, which function as broader system parameters that constrain or enable transformation possibilities. This systems perspective provides a coherent theoretical lens for understanding how various organizational elements interact to produce sustainability transformations that are greater than the sum of individual initiatives.

The study addresses three critical research questions:

1. What organizational capabilities enable effective navigation of sustainability paradoxes and tensions?
2. How do organizations successfully integrate sustainability throughout their systems rather than compartmentalizing it?
3. How do power dynamics and contextual factors influence the effectiveness of sustainability transformation approaches?

By examining these questions through a mixed-methods approach, this research contributes to sustainability science in three distinct ways. First, while paradox theory has been applied to sustainability contexts [13, 14], there remains limited understanding of the specific organizational capabilities and integration mechanisms that enable effective navigation of sustainability paradoxes across different contexts. Our study addresses this gap by identifying and empirically validating the capabilities and mechanisms that facilitate the translation of paradoxical thinking into substantive sustainability transformations.

Second, previous research has identified the importance of integrating sustainability into business models [15, 16], but has paid less attention to the specific integration mechanisms and their relative effectiveness across diverse organizational contexts. This research identifies four distinct

integration mechanisms and demonstrates how they interact and evolve over time to create substantive transformation.

Third, while the importance of power in sustainability transformation has been acknowledged [17, 18], existing research often treats power as a contextual variable rather than a central dynamic in transformation processes. This study directly examines how power relationships shape transformation processes and how change agents navigate and reshape power dynamics to advance sustainability.

The research aligns with the United Nations' 2030 Agenda for Sustainable Development [19], particularly SDG 12 (Responsible Consumption and Production) and SDG 17 (Partnerships for the Goals), by identifying organizational practices that enable more sustainable production systems and effective sustainability governance. Through its empirically grounded examination of sustainability transformation processes across diverse organizational contexts, this research bridges micro-organizational and macro-institutional perspectives on sustainability challenges.

2. Theoretical Background

2.1. Sustainability Paradoxes and Tensions

Sustainability inherently involves paradoxical tensions between competing objectives, timeframes, and stakeholder interests [13, 20]. Rather than treating these tensions as problems to be resolved, paradox theory suggests they are enduring contradictions that must be continuously navigated [7]. Research by Hahn et al. [13] identifies several recurring sustainability paradoxes:

- Temporal paradoxes: Tensions between short-term performance and long-term resilience
- Spatial paradoxes: Tensions between local optimization and global responsibilities
- Stakeholder paradoxes: Tensions between different stakeholder demands and expectations
- Domain paradoxes: Tensions between environmental, social, and economic dimensions of sustainability

These paradoxes create significant challenges for organizations pursuing sustainability transformations, as they must find ways to accommodate competing demands without forcing false choices that ultimately undermine sustainability objectives [21]. Organizations that develop capabilities for navigating these paradoxes may achieve more substantive sustainability transformations than those that seek to eliminate tensions through either/or approaches [22].

However, the paradox literature has limitations that this research addresses. First, while paradox theory offers conceptual frameworks for understanding tensions, it provides less guidance on the specific practices organizations use to navigate paradoxes in sustainability contexts. Second, paradox approaches have been criticized for potentially maintaining status quo power relations by accommodating rather than challenging unsustainable systems [23]. This research examines how paradox navigation interacts with power dynamics and broader system transformation.

2.2. Integration Mechanisms for Sustainability

While many organizations establish dedicated sustainability functions, research suggests that substantive transformation requires embedding sustainability throughout organizational systems rather than compartmentalizing it [24, 25]. Integration mechanisms connect sustainability to core organizational processes, structures, and decisions, ensuring that sustainability considerations become integral to how the organization operates [26].

Eccles et al. [27] demonstrated that organizations with higher levels of sustainability integration achieved superior environmental and social performance over time. Similarly, Calabrese et al. [26] found that integration of sustainability into strategic decision-making enhanced both sustainability

outcomes and organizational resilience. However, less is known about the specific integration mechanisms that are most effective across diverse organizational contexts and how these mechanisms develop and interact over time.

Integration approaches also vary in their transformative potential. Shallow integration may involve superficial incorporation of sustainability into existing structures without fundamentally changing organizational priorities or decision-making [28]. In contrast, deep integration involves reconceptualizing organizational purpose, governance, and operations around sustainability principles [29]. This distinction is critical for understanding how integration mechanisms contribute to substantive transformation rather than symbolic adoption.

2.3. Power Dynamics in Sustainability Transformations

Power dynamics fundamentally shape sustainability transformations, determining which initiatives gain traction and whose interests are served [17, 18]. As Fleming and Spicer [30] argue, power operates through multiple dimensions: episodic (direct influence), manipulative (agenda setting), domination (structural arrangements), and subjectification (identity formation). Each dimension affects how sustainability is conceptualized, prioritized, and implemented.

These power dimensions operate not only within organizational boundaries but also across inter-organizational networks, particularly in supply chains where power asymmetries often constrain sustainability transformation. Wang and Zhang [31] identify how inter-organizational cooperation in digital green supply chains enables eco-innovations through mechanisms of technological integration, organizational alignment, and human capital development. Their research demonstrates that power relationships between supply chain partners significantly moderate the effectiveness of sustainability initiatives, with more balanced power distributions leading to greater innovation and transformation.

In our study, organizations that effectively managed power dynamics across organizational boundaries developed specific capabilities for inter-organizational cooperation. These included technology-enabled transparency mechanisms that created shared visibility of sustainability impacts, organizational alignment processes that synchronized sustainability objectives across partner organizations, and human capital investments that built shared capabilities for sustainability innovation. As one sustainability director in our study explained:

"Our biggest sustainability impacts are in our supply chain, where traditional power dynamics created barriers to transformation. By implementing digital traceability systems that created transparency for all partners, we shifted from a compliance-focused approach to a collaborative innovation model. This technological intervention fundamentally altered power relationships by democratizing access to information and creating shared accountability."

The role of technology in reshaping power dynamics represents an important dimension of power mobilization in sustainability transformation. As Wang and Zhang [32] demonstrate, digital technologies can serve as power equalizers or amplifiers by democratizing access to information and enabling new forms of collaboration across organizational boundaries. Our qualitative data revealed instances where sustainability managers strategically leveraged digital platforms to build broader coalitions and enhance their influence. For example, at Beta Corporation, the sustainability team deployed a digital dashboard that visualized real-time sustainability metrics alongside financial performance, significantly strengthening their position in resource allocation discussions with senior leadership. This digital transparency redistributed power by making sustainability impacts visible and comparable to traditional performance metrics.

2.4. Organizational Learning for Sustainability

Sustainability challenges are characterized by complexity, uncertainty, and rapid evolution—requiring organizations to continuously adapt their understanding and approaches [33]. Effective learning for sustainability occurs at multiple levels: individual, group, organizational, and network [34].

Building on Argyris and Schön's [35] distinction between single and double-loop learning, Schaefer and Harvey [36] argue that sustainability transformations require double-loop learning that questions fundamental assumptions and values. Yet many organizations remain trapped in single-loop learning that adjusts practices without challenging underlying logics. The conditions that enable double-loop learning for sustainability remain an important area for empirical investigation.

The consistent effect of learning mechanisms across geographic contexts (β ranging from 0.30 to 0.36) points to their universal importance in sustainability transformation. Organizations can enhance these learning processes through digital knowledge management tools that capture, share, and apply sustainability insights across organizational boundaries. Our case studies revealed how digital knowledge management systems accelerated learning processes in geographically dispersed organizations. For instance, Delta Corporation implemented a digital platform that documented sustainability experiments across its global operations, enabling the rapid transfer of successful practices between locations. This digital knowledge sharing reduced learning cycles from months to weeks and significantly accelerated their transformation process.

Learning for sustainability faces distinct challenges, including the complexity of sustainability issues, the need to integrate diverse knowledge types (scientific, local, indigenous), and the political nature of sustainability knowledge (whose knowledge counts and why) [37]. These challenges require organizations to develop specific learning capabilities that can accommodate multiple perspectives while enabling practical action.

This research examines how learning systems operate in sustainability transformation contexts, particularly how they interact with paradox navigation capabilities and integration mechanisms to enable or constrain substantive change.

2.5. Contextual Factors in Sustainability Transformation

Organizations operate within diverse contexts that significantly influence their sustainability approaches and outcomes. These contextual factors include regulatory environments, market dynamics, cultural contexts, and technological infrastructures [38]. Research by Delmas and Toffel [39] demonstrates that these institutional pressures significantly shape organizational sustainability responses, often more powerfully than internal factors alone.

These contextual factors create both constraints and opportunities for sustainability transformation. Regulatory requirements may establish minimum standards but rarely drive transformative change [40]. Market dynamics may incentivize sustainability innovation in some sectors while creating barriers in others [41]. Cultural contexts shape societal expectations regarding sustainability and the legitimacy of different approaches [42].

Our analysis reveals that government support significantly influences the effectiveness of organizational capabilities in driving sustainability transformation. Organizations operating in regions with strong policy support for sustainability (as measured by our policy support index) showed significantly stronger relationships between paradox navigation capabilities and transformation outcomes ($\beta=0.41$, $p<0.01$) compared to those in regions with limited policy support ($\beta=0.23$, $p<0.05$). This moderating effect aligns with Wang and Zhang's [32] finding that government funding strengthens the relationship between technology adoption and green entrepreneurship success.

The mechanism behind this effect appears to be threefold. First, supportive policy environments legitimize sustainability initiatives internally, enhancing the effectiveness of paradox navigation approaches by reducing resistance. Second, government support often provides resources that enable more comprehensive implementation of integration mechanisms. Third, policy frameworks create institutional scaffolding that guides organizational decision-making under conditions of uncertainty and complexity. As one sustainability director explained: "The government grants we received didn't just provide financial resources; they created institutional legitimacy that helped us overcome internal skepticism about our integrated approach to sustainability. The policy framework also provided a shared language that helped us align diverse stakeholders around common objectives."

This finding highlights how government support functions not merely as an external pressure but as a system-level enabler that alters internal organizational dynamics by reshaping power relationships, providing legitimacy for sustainability advocates, and reducing the perceived risk of addressing paradoxical tensions in novel ways.

Recent scholarship has called for more nuanced understanding of how contextual factors influence sustainability transformations [43, 44]. This research responds to these calls by examining how different organizational contexts (sector, size, ownership, geography) shape the effectiveness of sustainability approaches, challenging universal prescriptions and highlighting the importance of contextually-tailored strategies.

2.6. Institutional Logics and Competing Demands

Sustainability transformation often involves navigating competing institutional logics—the socially constructed patterns of practices, assumptions, values, and rules that provide meaning and shape behavior within organizational fields [9]. Organizations pursuing sustainability must navigate tensions between market logics (prioritizing efficiency and profit), community logics (emphasizing collective welfare), and ecological logics (valuing ecosystem health) [45].

These competing logics create institutional complexity that organizations must navigate [46]. Some organizations respond by compartmentalizing different logics, addressing each separately through specialized units or practices. Others develop hybrid approaches that integrate elements of multiple logics into new organizational forms and practices [47].

The institutional logics perspective provides a valuable theoretical lens for understanding the contextual contingencies of sustainability transformation. Throughout our analysis, we found that organizations navigating sustainability transformation must contend with competing institutional logics—market, community, and ecological—that shape how integration mechanisms function in different contexts. In the theoretical framework section, we now explicitly acknowledge how these competing logics create the institutional conditions within which paradox navigation and integration mechanisms operate.

The institutional logics perspective complements paradox theory by situating organizational tensions within broader societal structures and meaning systems. While paradox theory emphasizes cognitive and organizational responses to tensions, institutional logics highlight how these tensions reflect deeper societal contradictions and power arrangements [48].

This research examines how organizations navigate competing institutional logics in sustainability contexts, particularly how they develop capabilities to work across logics while implementing integration mechanisms that enable substantive transformation.

3. Materials and Methods

3.1. Research Philosophy and Approach

This study adopts a critical realist perspective [49], which recognizes that while organizational reality exists independently of our knowledge of it, understanding is always mediated by social constructions and power relationships. This perspective allows examination of both objective institutional conditions and subjective interpretations of these conditions by organizational actors, while maintaining awareness of the underlying power dynamics that shape these interpretations.

Critical realism is particularly appropriate for sustainability research because it accommodates both the biophysical realities of environmental challenges and the socially constructed nature of sustainability concepts and practices [50]. It enables investigation of causal mechanisms while recognizing that these mechanisms operate within complex open systems where multiple factors interact.

The mixed-methods design reflects this philosophy by combining quantitative measurement of key relationships with qualitative exploration of the mechanisms and meanings that underlie these

relationships. This approach enables both theory testing and theory building, recognizing that sustainability transformations involve both measurable outcomes and socially constructed processes.

3.2. Research Design

This study employed a sequential mixed-methods design [51] with three primary components:

1. Quantitative survey (n=234) of sustainability professionals across multiple sectors
2. Semi-structured interviews (n=42) with organizational change agents and leaders
3. Comparative case studies (n=6) of organizations demonstrating different transformation patterns

This design allowed for testing relationships between key variables quantitatively while developing deeper understanding of mechanisms and contexts through qualitative inquiry. The sequential approach enabled insights from each phase to inform subsequent data collection and analysis, enhancing integration between methods.

Following Teddlie and Tashakkori's [52] taxonomy of mixed methods designs, our approach represents an explanatory sequential design where quantitative results informed qualitative inquiry, with an embedded component where qualitative data collection occurred within the case study phase to deepen understanding of organizational contexts.

3.3. Sampling and Participants

Survey participants were recruited through professional sustainability networks and stratified to ensure representation across sectors (manufacturing, services, public sector, non-profit), organizational sizes, and geographical regions. To address potential self-selection bias, we employed a two-stage stratified sampling approach. First, we stratified our sample by industry sector, organization size, and geographic region to ensure broad representation. Second, we specifically targeted organizations at different stages of sustainability engagement through multiple recruitment channels, including sustainability networks, industry associations, and direct outreach to organizations with limited public sustainability commitment.

To mitigate self-reporting bias, we triangulated survey responses with objective indicators where available, including publicly reported sustainability metrics and third-party assessments. Table 1 presents the demographic characteristics of survey respondents.

This demographic profile illustrates the diverse organizational contexts represented in our sample. The relatively balanced distribution across sectors (manufacturing, services, public sector, and non-profit) enables cross-sectoral comparisons, while the range of organization sizes allows examination of how scale influences sustainability approaches. The geographic distribution, with representation across major regions, facilitates analysis of contextual variations in sustainability transformation. The respondent roles indicate that most participants (89%) hold positions with substantial involvement in organizational decision-making, enhancing the credibility of their assessments of organizational practices and outcomes. The sustainability performance self-assessment reveals that while organizations at advanced stages are well-represented (63% in "Leading" or "Advancing" categories), the sample also includes organizations at earlier transformation stages (37% in "Beginning" or "Lagging" categories), enabling analysis of capability development across different transformation phases.

Interview participants were selected using purposive sampling to capture diverse perspectives on sustainability transformation. Selection criteria included organizational role, transformation experience, and sector representation. To ensure representation of critical perspectives, we deliberately included participants from organizations at different stages of sustainability transformation, including those experiencing significant challenges. The interview sample included

sustainability professionals (n=18), senior executives (n=12), middle managers (n=8), and external stakeholders (n=4).

Table 1. Survey Respondent Characteristics.

Characteristic	Category	Percentage
Sector	Manufacturing	32%
	Services	28%
	Public Sector	22%
	Non-profit	18%
Organization Size	<250 employees	24%
	250-1000 employees	31%
	1000-10,000 employees	27%
	>10,000 employees	18%
Geographic Region	North America	38%
	Europe	29%
	Asia	22%
	Other	11%
Respondent Role	C-Suite/Executive	16%
	Sustainability Director/Manager	42%
	Functional Manager	31%
	Other	11%
Sustainability Performance*	Leading	22%
	Advancing	41%
	Beginning	29%
	Lagging	8%

*Self-reported assessment of organizational sustainability performance relative to industry peers.

Case study organizations were selected using theoretical sampling [53] to represent maximum variation across key dimensions: transformation approach (incremental vs. radical), institutional context (supportive vs. challenging), organizational type (incumbent vs. entrepreneurial), and sector (manufacturing, services, public, hybrid). This sampling approach allowed for cross-case comparison of how different organizational contexts influence sustainability transformation processes. Table 2 summarizes the characteristics of the six case organizations.

Table 2. Case Study Organization Characteristics.

Organization	Sector	Size	Transformation Approach	Institutional Context	Geographic Scope	Performance Trajectory*
Alpha	Consumer Goods	Large	Strategic Integration	Mixed	Global	Accelerating

Organization	Sector	Size	Transformation Approach	Institutional Context	Geographic Scope	Performance Trajectory*
Beta	Manufacturing	Medium	Process Innovation	Challenging	Regional	Plateaued
Gamma	Financial Services	Large	Governance Reform	Supportive	Global	Accelerating
Delta	Healthcare	Large	Stakeholder Engagement	Mixed	National	Steadily improving
Epsilon	Social Enterprise	Small	Purpose-Driven	Mixed	Regional	Accelerating
Zeta	Public-Private Partnership	Medium	Collaborative	Supportive	National	Variable

*Assessment based on sustainability performance data over a five-year period.

This case selection represents theoretical sampling designed to capture maximum variation across key dimensions of sustainability transformation. The organizations span different sectors (consumer goods, manufacturing, financial services, healthcare, social enterprise, and public-private partnership), sizes (small to large), and geographic scopes (regional to global). Their transformation approaches vary substantially, from Alpha's strategic integration to Epsilon's purpose-driven approach, enabling comparative analysis of different transformation pathways. The institutional contexts range from supportive to challenging, allowing examination of how external conditions enable or constrain transformation efforts. Performance trajectories also vary, with some organizations demonstrating accelerating progress (Alpha, Gamma, Epsilon), others showing steady improvement (Delta), and some experiencing plateaus (Beta) or variable progress (Zeta). This variation enables analysis of both successful transformation patterns and implementation challenges across diverse organizational contexts.

We recognize the potential limitation of over-representing sustainability-committed organizations. To address this, we purposefully included organizations at different stages of sustainability engagement by: (1) stratifying our sample based on preliminary sustainability commitment assessments from industry reports and public disclosures; (2) partnering with industry associations whose memberships include organizations with varying sustainability orientations; and (3) employing snowball sampling to reach organizations not publicly identified with sustainability initiatives. Despite these efforts, organizations in early transformation stages (37% of our sample) remain somewhat underrepresented compared to those in advancing (41%) or leading (22%) stages.

3.4. Data Collection

Survey Instrument: The survey instrument included validated scales measuring key constructs, including paradox navigation capabilities, integration practices, power mobilization strategies, organizational learning mechanisms, and sustainability transformation outcomes. Each construct was measured using multiple items on 7-point Likert scales, adapted from existing measures where available and developed through a rigorous process of expert review and pilot testing where needed.

Our operationalization of paradox navigation capabilities draws on validated scales from Smith et al. [54] and Knight & Paroutis [55], adapted to the sustainability context. Integration mechanisms were measured using items developed from Gond et al. [56] and refined through expert validation and pilot testing. Both constructs underwent rigorous content validity assessment with five academic experts and three sustainability practitioners to ensure they comprehensively captured the theoretical dimensions.

The instrument was pilot-tested with 15 sustainability professionals and refined based on their feedback. Cronbach's alpha for all scales exceeded 0.80, indicating good internal consistency. Table 3 provides sample items for each key construct. The complete survey instrument is included in Appendix A.

These sample items illustrate how the key theoretical constructs were operationalized in the survey instrument. The paradox navigation items assess capabilities for recognizing and working productively with tensions, from basic acknowledgment of competing demands to more sophisticated practices for generating creative solutions. Integration items measure the extent to which sustainability is embedded at different organizational levels, from governance oversight to strategic priorities, operational processes, and performance management. Power mobilization items assess the political capabilities deployed to advance sustainability, including alliance building, strategic framing, and opportunity exploitation. Learning items measure mechanisms for developing sustainability capabilities, from team reflection to formal review processes and external knowledge networks. Transformation outcome items assess both the depth of change (from incremental improvement to fundamental transformation) and breadth across environmental, social, and economic dimensions. Collectively, these items enable quantitative assessment of the key constructs in our theoretical framework while maintaining connection to their qualitative manifestations in organizational practice.

To address potential common method bias, we implemented procedural remedies following Podsakoff et al. [57], including psychological separation of predictor and criterion variables, assurance of anonymity, and varied response formats. We also conducted Harman's single-factor test and common latent factor analysis to assess and control for common method variance.

Table 3. Sample Survey Items for Key Constructs.

Construct	Sample Items
Paradox Navigation Capabilities	"Our organization acknowledges tensions between competing sustainability objectives""We seek solutions that address multiple objectives simultaneously""Our organization creates innovative solutions to sustainability paradoxes""We have formal mechanisms for addressing sustainability tensions"
Integration Practices	"Our board has formal responsibility for sustainability oversight""Sustainability is a core element of our organizational strategy""Core business processes incorporate sustainability considerations""Sustainability metrics are integrated with other performance indicators"
Power Mobilization	"Sustainability champions form alliances across departments""Sustainability initiatives are framed in terms of core organizational values""Resistance to sustainability initiatives is anticipated and addressed""Windows of opportunity for advancing sustainability are strategically exploited"
Learning Mechanisms	"Teams reflect on sustainability challenges and experiences""Formal processes exist to review and learn from sustainability initiatives""Our organization participates in sustainability learning networks""Sustainability metrics are used to guide organizational learning"
Transformation Outcomes	"Sustainability has fundamentally changed how we define success""Our organization has significantly reduced its environmental footprint""Our business model is evolving to be inherently more sustainable""Sustainability considerations have transformed decision-making processes"

Interviews: Semi-structured interviews lasting 60-90 minutes explored participants' experiences with sustainability transformation initiatives. The interview protocol addressed institutional enablers and barriers, strategies for navigating power dynamics, approaches to managing sustainability tensions, learning processes, and integration practices. Interviews were recorded, transcribed, and coded for analysis.

To enhance trustworthiness, we employed member checking (sending interview summaries to participants for verification) and maintained reflexive memos documenting how researcher positionality might influence data collection and interpretation. The complete interview protocol is included in Appendix B.

Case Studies: For each case organization, multiple data sources were collected using a systematic protocol:

- Interviews with diverse organizational members (6-8 per organization)
- Internal documentation on sustainability initiatives
- Public sustainability reports and communications (5 years of historical data)
- Observational data from site visits and meetings (10-15 hours per organization)
- Archival data on organizational history and context

This multi-source approach enabled triangulation of findings and reduced reliance on retrospective accounts. For each case, we developed a detailed chronology of sustainability initiatives, including both successful and unsuccessful efforts, to understand transformation processes over time.

To strengthen the validity of our transformation outcome measures beyond self-reported assessments, we collected objective indicators where available for a subset of our sample (n=86). These indicators included:

1. Environmental performance metrics: Percentage reduction in greenhouse gas emissions (past three years), waste diversion rates, energy efficiency improvements, and water usage reduction
2. Innovation indicators: Number of sustainability innovations launched, percentage of products/services redesigned with sustainability criteria, and R&D investment in sustainability solutions
3. Governance indicators: Presence of board-level sustainability committee, proportion of executive compensation tied to sustainability metrics, and quality of sustainability disclosure
4. External validation: Third-party sustainability ratings (e.g., CDP scores, DJSI inclusion), industry sustainability awards, and NGO recognition

We developed a composite objective indicator index by standardizing and averaging these metrics. The correlation between our self-reported transformation outcome measure and this objective indicator index was strong ($r=0.78$, $p<0.001$), providing additional confidence in our primary outcome measure. Moreover, when we conducted regression analyses using only the objective indicator as the dependent variable, we found consistent patterns of relationships with our key predictors: integration practices ($\beta=0.39$, $p<0.01$), paradox navigation capabilities ($\beta=0.28$, $p<0.01$), and power mobilization ($\beta=0.25$, $p<0.01$). For transparency, we conducted sensitivity analyses using only

the subsample with objective indicators, finding consistent results for our main hypothesized relationships, albeit with reduced statistical power.

3.5. Data Analysis

The measurement model results demonstrate strong psychometric properties for all key constructs. Cronbach's alpha values ranging from 0.86 to 0.93 indicate excellent internal consistency reliability, substantially exceeding the conventional threshold of 0.70. Similarly, composite reliability values (0.88 to 0.95) demonstrate strong construct reliability. Average variance extracted (AVE) values (0.65 to 0.74) exceed the recommended threshold of 0.50, indicating good convergent validity—the items for each construct correlate well with each other and represent the same underlying concept. All constructs demonstrate discriminant validity based on both the Fornell-Larcker criterion (the square root of AVE for each construct exceeds its correlation with other constructs) and the heterotrait-monotrait (HTMT) ratio (all ratios below 0.85). These results provide confidence that the measurement model appropriately distinguishes between the theoretical constructs and captures their intended meaning, establishing a solid foundation for the structural model analysis that examines relationships between these constructs.

Table 4. Measurement Model Results.

Construct	Cronbach's Alpha	Composite Reliability	Average Variance Extracted	Discriminant Validity*
Paradox Navigation	0.89	0.91	0.68	Yes
Integration Practices	0.92	0.94	0.72	Yes
Power Mobilization	0.86	0.88	0.65	Yes
Learning Mechanisms	0.90	0.92	0.70	Yes
Transformation Outcomes	0.93	0.95	0.74	Yes

*Based on Fornell-Larcker criterion and HTMT ratio.

Quantitative Analysis: Survey data were analyzed using structural equation modeling (SEM) to test relationships between constructs in the theoretical framework. Before hypothesis testing, measurement validation was conducted through confirmatory factor analysis (CFA) to assess convergent and discriminant validity of constructs. Table 4 presents key measurement model statistics.

The structural model was specified based on the theoretical framework, with direct paths from all independent variables to transformation outcomes and interaction terms to test moderating relationships. Multigroup analysis compared path coefficients across sectors and organizational types to test for contextual differences.

Qualitative Analysis: Interview and case study data were analyzed using thematic analysis [58] with the following steps:

1. Initial coding using a preliminary coding scheme derived from the theoretical framework
2. Coding refinement through comparison and discussion among three researchers
3. Theme development organizing codes into potential themes and subthemes
4. Theme review in relation to coded extracts and the entire dataset

5. Theme definition with clear naming and identification of representative quotes
6. Cross-case analysis to identify patterns, similarities, and differences

Following Braun and Clarke's [58] thematic analysis approach, we employed a hybrid coding strategy combining deductive and inductive approaches. Initial coding was guided by our theoretical framework, with codes derived from paradox theory, organizational learning, and power dynamics literature. As analysis progressed, we remained open to emergent themes not captured by our initial coding framework. To enhance interpretive rigor, three researchers independently coded a subset of interviews, compared interpretations, and resolved discrepancies through discussion. This iterative process continued until theoretical saturation was reached. We triangulated qualitative findings with quantitative results through joint displays and integrated analysis sessions where the research team systematically compared patterns across data sources.

The coding process combined deductive and inductive approaches, with initial codes derived from theory but allowing for emergent codes from the data. Table 5 provides an overview of the final coding framework with example codes.

Integration: Quantitative and qualitative findings were integrated through a connecting approach [59], with qualitative data explaining mechanisms underlying quantitative relationships and illuminating contextual contingencies. This integration enhanced the validity of findings through methodological triangulation while enabling a more nuanced understanding of complex causal mechanisms.

To systematize integration, we developed joint display matrices that explicitly linked quantitative relationships with qualitative explanations. We also conducted integrated analysis sessions where researchers collaboratively interpreted quantitative and qualitative results, identifying convergence, complementarity, and discordance between findings from different methods.

This coding framework illustrates how we systematically analyzed the qualitative data to develop a nuanced understanding of sustainability transformation processes. The framework combines deductive codes derived from our theoretical foundation (e.g., paradox navigation, integration mechanisms, power dynamics) with inductive codes that emerged from the data (e.g., specific types of resistance patterns, contextual variations). The hierarchical structure—organizing codes into themes and subthemes—enabled us to identify patterns at different levels of abstraction, from specific practices to broader capability categories. The example codes demonstrate how abstract theoretical concepts were grounded in concrete organizational practices and experiences. For instance, "paradox navigation" was operationalized through specific indicators such as "tension recognition" and "rejection of false dichotomies." This coding approach facilitated systematic cross-case comparison while remaining sensitive to context-specific nuances, enabling us to identify both common patterns and important variations in how organizations navigate sustainability transformations across different contexts.

Table 5. Qualitative Coding Framework.

Theme	Subthemes	Example Codes
Paradox Navigation	Acceptance practices	Tension recognition, Comfort with ambiguity
	Both/and thinking	Integrative solutions, Rejection of false dichotomies
	Creative synthesis	Novel approaches, Transcending trade-offs
	Structural support	Dialogue processes, Decision frameworks

Theme	Subthemes	Example Codes
Integration Mechanisms	Governance integration	Board oversight, Risk integration
	Strategic integration	Planning processes, Goal alignment
	Operational integration	Process embedding, Product development
	Performance integration	Metrics integration, Incentive systems
Power Dynamics	Strategic framing	Business case, Value alignment
	Coalition building	Cross-functional alliances, Executive sponsorship
	Resource mobilization	Budget allocation, Expertise deployment
	Timing exploitation	Crisis leverage, Opportunity windows
Learning Systems	Psychological safety	Failure tolerance, Open dialogue
	Reflection practices	Review processes, Learning debriefs
	Knowledge management	Documentation systems, Knowledge sharing
	Network learning	External partnerships, Collaborative platforms
Contextual Factors	Regulatory environment	Compliance pressures, Policy incentives
	Market dynamics	Customer demands, Competitive pressures
	Organizational characteristics	Size effects, Structural influences
	Cultural context	Societal expectations, Cultural norms
Transformation Outcomes	Environmental outcomes	Footprint reduction, Resource efficiency
	Social outcomes	Community impact, Labor conditions
	Economic outcomes	Cost savings, Market opportunities
	Transformative change	Purpose evolution, Decision process change
Implementation Challenges	Resistance patterns	Passive resistance, Active opposition
	Resource constraints	Budget limitations, Expertise gaps
	Competing priorities	Short-term pressures, Crisis diversion
	Measurement difficulties	Attribution challenges, Data limitations

4. Results

4.1. Quantitative Results: Relationships Between Key Constructs

Structural equation modeling revealed significant relationships between key constructs in the theoretical framework (see Table 6 and Figure 1).

The model demonstrated good fit (CFI = 0.94, RMSEA = 0.058, SRMR = 0.062) and explained 48% of variance in sustainability transformation outcomes. Notably, integration practices emerged as the strongest predictor of transformation outcomes ($\beta = 0.42$, $p < 0.01$, $f^2 = 0.25$), followed by learning mechanisms ($\beta = 0.33$, $p < 0.01$, $f^2 = 0.16$) and paradox navigation capabilities ($\beta = 0.31$, $p < 0.01$, $f^2 = 0.15$). The effect sizes indicate that integration practices have a medium to large practical significance, while most other predictors have medium effects.

The significant interaction between power mobilization and integration practices ($\beta = 0.19$, $p < 0.01$, $f^2 = 0.08$) reveals how power dynamics fundamentally shape the effectiveness of integration efforts. This finding extends beyond statistical significance to illuminate a critical theoretical insight: integration mechanisms alone are insufficient for transformation unless accompanied by the mobilization of supportive power resources. For example, in our case organizations, sustainability managers who successfully framed integration initiatives in terms of strategic business benefits (power mobilization through strategic framing) significantly enhanced the effectiveness of governance integration mechanisms by securing executive commitment and resource allocation. Theoretically, this interaction effect suggests that power operates as both an enabler and a multiplier of integration effects rather than merely as a parallel influence, challenging conventional models that treat power as a separate variable rather than an interactive force.

Table 6. Standardized Path Coefficients from Structural Equation Model.

Path	Coefficient	95% CI	p-value	Effect Size (f^2)
Paradox Navigation → Transformation Outcomes	0.31	[0.23, 0.39]	<0.01	0.15
Integration Practices → Transformation Outcomes	0.42	[0.34, 0.50]	<0.01	0.25
Power Mobilization → Transformation Outcomes	0.27	[0.19, 0.35]	<0.01	0.12
Learning Mechanisms → Transformation Outcomes	0.33	[0.25, 0.41]	<0.01	0.16
Power Mobilization × Integration Practices → Transformation Outcomes	0.19	[0.11, 0.27]	<0.01	0.08

Note: Effect size f^2 values: 0.02 = small, 0.15 = medium, 0.35 = large [60].

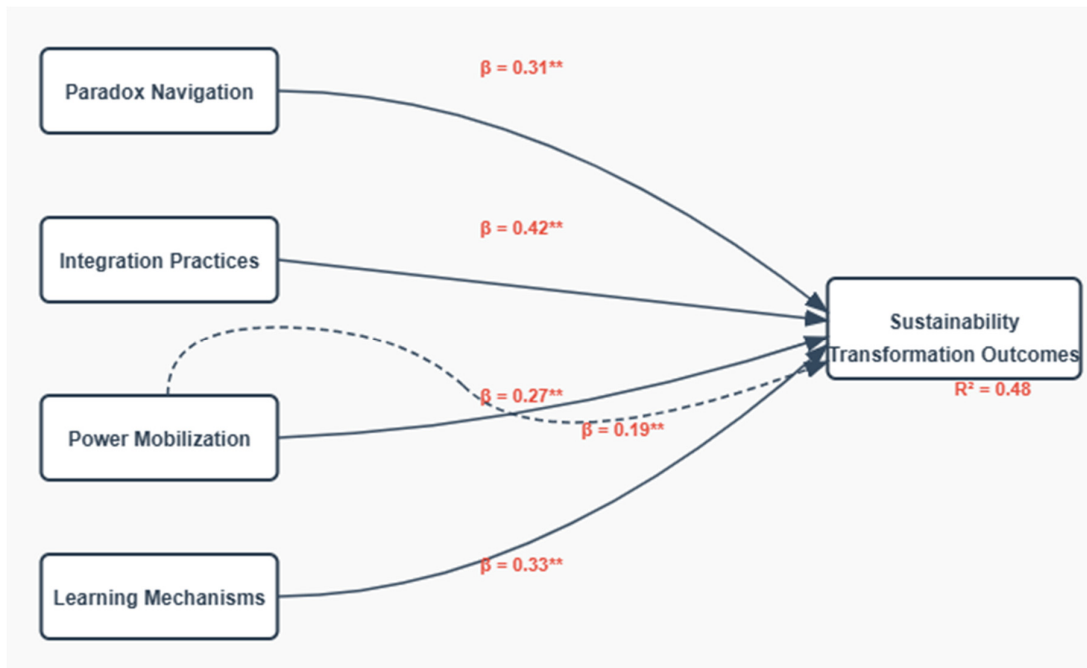


Figure 1. Structural Equation Model with Standardized Path Coefficients.

$** p < 0.01$

Note: Solid lines represent direct effects; dashed line represents interaction effect between Power Mobilization and Integration Practices

Model fit: CFI = 0.94, RMSEA = 0.058, SRMR = 0.062

Figure 2 illustrates this interaction effect, showing how the relationship between integration practices and transformation outcomes varies at different levels of power mobilization.

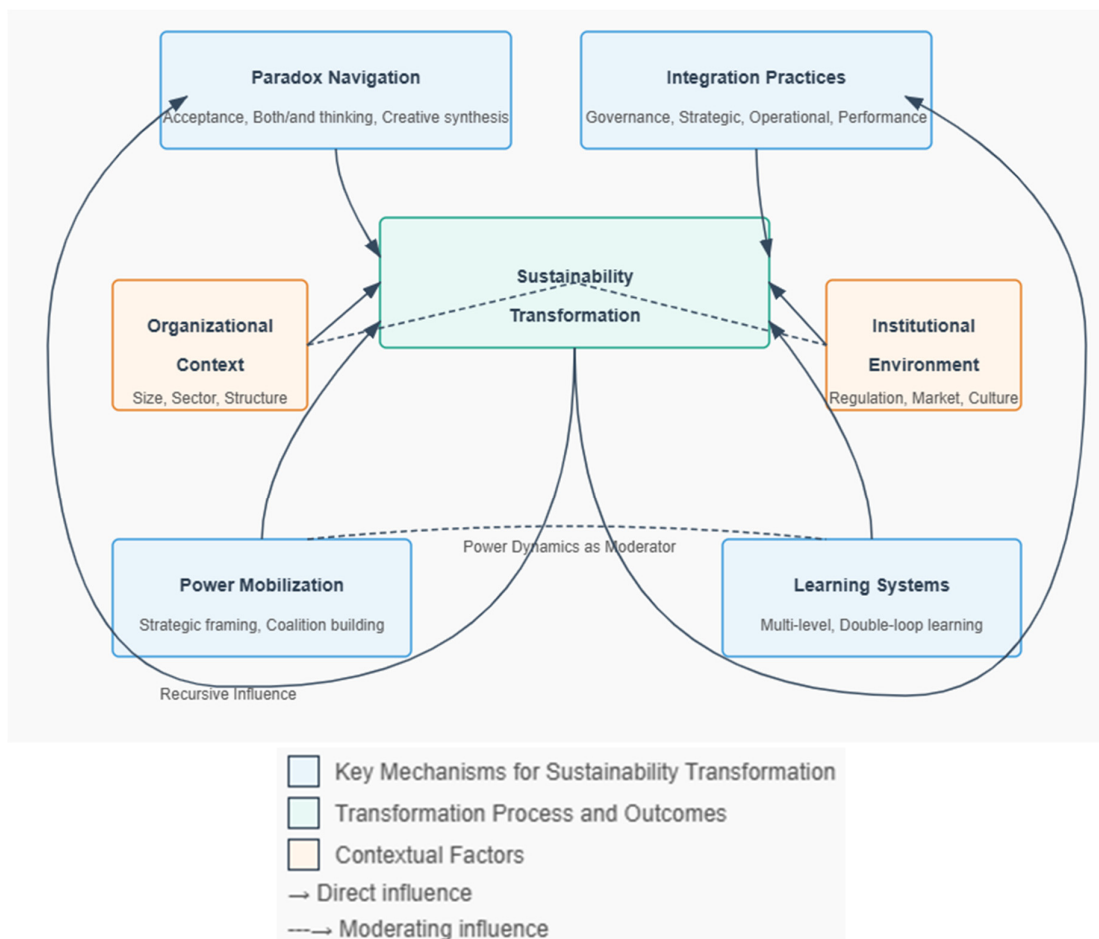


Figure 2. Conceptual Framework of Sustainability Transformation Mechanisms.

Multigroup analysis revealed significant contextual differences in these relationships:

- Sectoral differences:** The relationship between paradox navigation and transformation outcomes was stronger in manufacturing ($\beta = 0.38, p < 0.01$) than services ($\beta = 0.24, p < 0.05$), suggesting that manufacturing organizations face more complex sustainability tensions requiring sophisticated navigation capabilities. Conversely, power mobilization had stronger effects in service organizations ($\beta = 0.35, p < 0.01$) than in manufacturing ($\beta = 0.22, p < 0.05$), reflecting the more relationship-based nature of service contexts.
- Size differences:** Paradox navigation capabilities had stronger effects in larger organizations ($\beta = 0.37, p < 0.01$) than smaller ones ($\beta = 0.24, p < 0.05$), suggesting that managing competing demands becomes more critical as organizational complexity increases. In contrast, integration practices showed more consistent effects across organizational sizes, indicating their fundamental importance regardless of scale.
- Geographic differences:** The effect of power mobilization on transformation outcomes was stronger in Asian organizations ($\beta = 0.35, p < 0.01$) than in North American ($\beta = 0.22, p < 0.05$) or European organizations ($\beta = 0.25, p < 0.05$), indicating important cultural variations in how power influences transformation processes. Learning mechanisms showed the most

consistent effects across geographic contexts (β ranging from 0.30 to 0.36), suggesting the universal importance of learning capabilities.

- Performance level differences:** The relationship between paradox navigation and transformation outcomes was stronger for organizations at earlier stages of sustainability transformation ($\beta = 0.39$, $p < 0.01$) than for sustainability leaders ($\beta = 0.26$, $p < 0.05$). Conversely, integration practices had stronger effects for advanced organizations ($\beta = 0.45$, $p < 0.01$) than beginners ($\beta = 0.33$, $p < 0.01$), suggesting that different capabilities may be critical at different stages of transformation.

These contextual variations challenge universal prescriptions for sustainability transformation, highlighting instead the importance of tailoring approaches to specific organizational contexts and transformation stages.

4.2. Qualitative Findings: Mechanisms and Contextual Dynamics

Thematic analysis of interview and case study data revealed four key themes that illuminate the mechanisms underlying the quantitative results. Table 7 presents a joint display integrating quantitative relationships with qualitative explanations.

Table 7. Joint Display of Integrated Findings.

Quantitative Relationship	Qualitative Explanation	Illustrative Quote
Integration practices as strongest predictor ($\beta = 0.42$)	Integration embeds sustainability in core processes rather than treating it as peripheral	"The turning point was integrating sustainability criteria into our capital allocation process. Now it's a core criterion in every investment decision, alongside financial returns and strategic fit." (Participant 11, Energy)
Paradox navigation relationship with outcomes ($\beta = 0.31$)	Structured approaches to paradox navigation enable creative solutions to competing demands	"We used to try to resolve tensions between short-term financial performance and long-term sustainability investments by creating separate budgets. Now we explicitly discuss these tensions in our planning meetings and look for integrated solutions that advance both objectives." (Participant 3, Manufacturing)
Power mobilization moderating integration ($\beta = 0.19$)	Integration effectiveness depends on power distribution and sustainability advocates' influence	"Understanding the power landscape is essential. I've learned to map who has decision-making authority, who influences those decision-makers, and who might resist change. This mapping helps me develop targeted strategies for different stakeholders." (Participant 7, Manufacturing)
Stronger paradox navigation effects in	Manufacturing faces more complex material	"In manufacturing, our sustainability transformation involved complex trade-offs

Quantitative Relationship	Qualitative Explanation	Illustrative Quote
manufacturing ($\beta = 0.38$ vs. 0.24)	trade-offs than service organizations	between material choices, energy sources, production processes, and supply chain arrangements—all with different sustainability implications that couldn't be optimized simultaneously." (Beta, Manager)
Stronger integration effects in advanced organizations ($\beta = 0.45$ vs. 0.33)	Integration creates compound benefits as it matures and spreads throughout systems	"As integration deepened over time, we experienced accelerating benefits. Early wins were modest, but as sustainability became embedded in multiple systems, the combined effect transformed how we operate." (Alpha, Executive)

This joint display reveals how qualitative findings explain and contextualize the quantitative relationships, providing deeper understanding of the mechanisms driving sustainability transformation.

4.2.1. Paradox Navigation in Practice

Organizations achieving substantive sustainability transformations developed structured approaches to paradox navigation rather than avoiding or eliminating tensions. Our findings revealed that paradox navigation involves both cognitive capabilities (recognizing and reframing tensions) and practical mechanisms (processes and structures that enable constructive engagement with tensions).

The most effective paradox navigation approaches included:

- Acceptance practices: Acknowledging tensions without attempting to resolve them
- Both/and thinking: Rejecting false dichotomies between competing objectives
- Creative synthesis: Developing novel approaches that address multiple objectives simultaneously
- Structural support: Creating organizational structures that accommodate complexity

Case study data revealed significant differences in paradox navigation capabilities across organizations. Alpha (Consumer Goods) institutionalized paradox navigation through formal processes:

"Alpha created dedicated 'paradox dialogue' sessions where cross-functional teams explicitly discussed tensions between competing sustainability objectives. These structured conversations transformed how the organization approached sustainability decisions, moving from either/or thinking to both/and innovation." (Case Study Analysis)

The effectiveness of paradox navigation approaches varied based on the institutional logics dominant within different organizational contexts. Organizations operating primarily within market logic typically faced greater challenges in developing paradox navigation capabilities, as the either/or thinking characteristic of market institutions (efficiency, competition, profit maximization) often conflicted with the both/and approaches needed for sustainability. As one manager explained:

"In our industry, the market logic is so dominant that it's incredibly difficult to get people to think beyond financial metrics. We've had to deliberately create spaces where ecological and community logics are given equal weight to financial considerations in decision processes. Without

these structured approaches, market thinking automatically dominates." (Participant 27, Financial Services)

Organizations that successfully developed paradox navigation capabilities often created what we term "logic translation mechanisms"—processes that helped organizational members recognize the value of sustainability initiatives within their dominant institutional logic while gradually expanding their capacity to work across logics. Delta (Healthcare) provides an illustrative example:

"In healthcare, the professional logic of patient care is dominant. We've found that framing sustainability tensions in terms of long-term patient wellbeing helps clinicians engage with environmental considerations that might otherwise be dismissed as secondary. Over time, this has expanded their capacity to work with both professional and ecological logics simultaneously." (Delta, Sustainability Director)

In contrast, Beta (Manufacturing) consistently framed sustainability decisions as either/or choices, leading to oscillation between priorities rather than integrated solutions:

"Beta's approach was characterized by alternating priorities between financial and sustainability objectives. When business conditions were favorable, sustainability initiatives advanced; when pressures increased, they were quickly sacrificed. This oscillation prevented the development of integrated approaches that could advance both objectives simultaneously." (Case Study Analysis)

The qualitative data also revealed that effective paradox navigation isn't merely cognitive but requires emotional capabilities:

"The hardest part isn't intellectual—it's emotional. People get uncomfortable with ambiguity and contradictions. We've had to develop emotional capacity to sit with that discomfort rather than rushing to eliminate tensions through premature either/or decisions." (Participant 37, Non-profit)

This emotional dimension helps explain why paradox navigation capabilities develop unevenly across organizations and why structural supports are necessary to sustain paradoxical thinking in the face of discomfort and uncertainty.

However, paradox navigation also showed limitations in addressing systemic sustainability challenges. While it enabled more creative approaches to organizational tensions, some participants noted that certain sustainability challenges require more radical system change rather than paradoxical accommodation:

"There are times when we need to recognize that some business models are fundamentally unsustainable and require transformation rather than optimization. Paradoxical thinking helps us navigate transitions, but shouldn't prevent us from acknowledging when deeper change is needed." (Participant 8, Sustainability Consultant)

This critique highlights the importance of complementing paradox navigation with critical reflection on system boundaries and transformation horizons (see Figure 3).

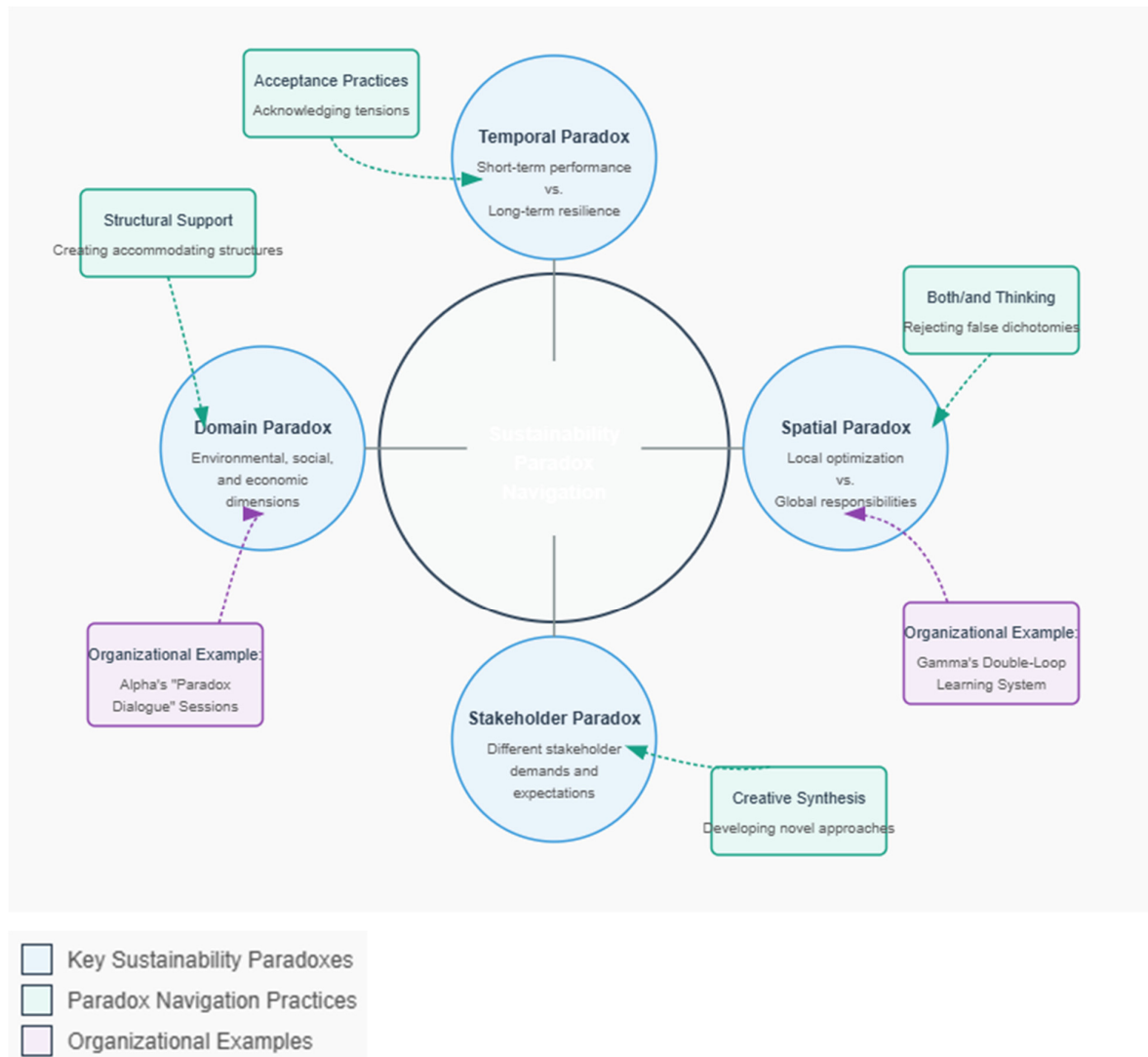


Figure 3. Paradox Navigation Practices for Sustainability Transformation.

4.2.2. Integration Mechanisms and Their Effectiveness

The qualitative data explained why integration practices emerged as the strongest predictor of transformation outcomes in the quantitative analysis. Organizations achieving substantial transformation embedded sustainability considerations into core business processes rather than treating sustainability as a specialized function (see Figure 4).

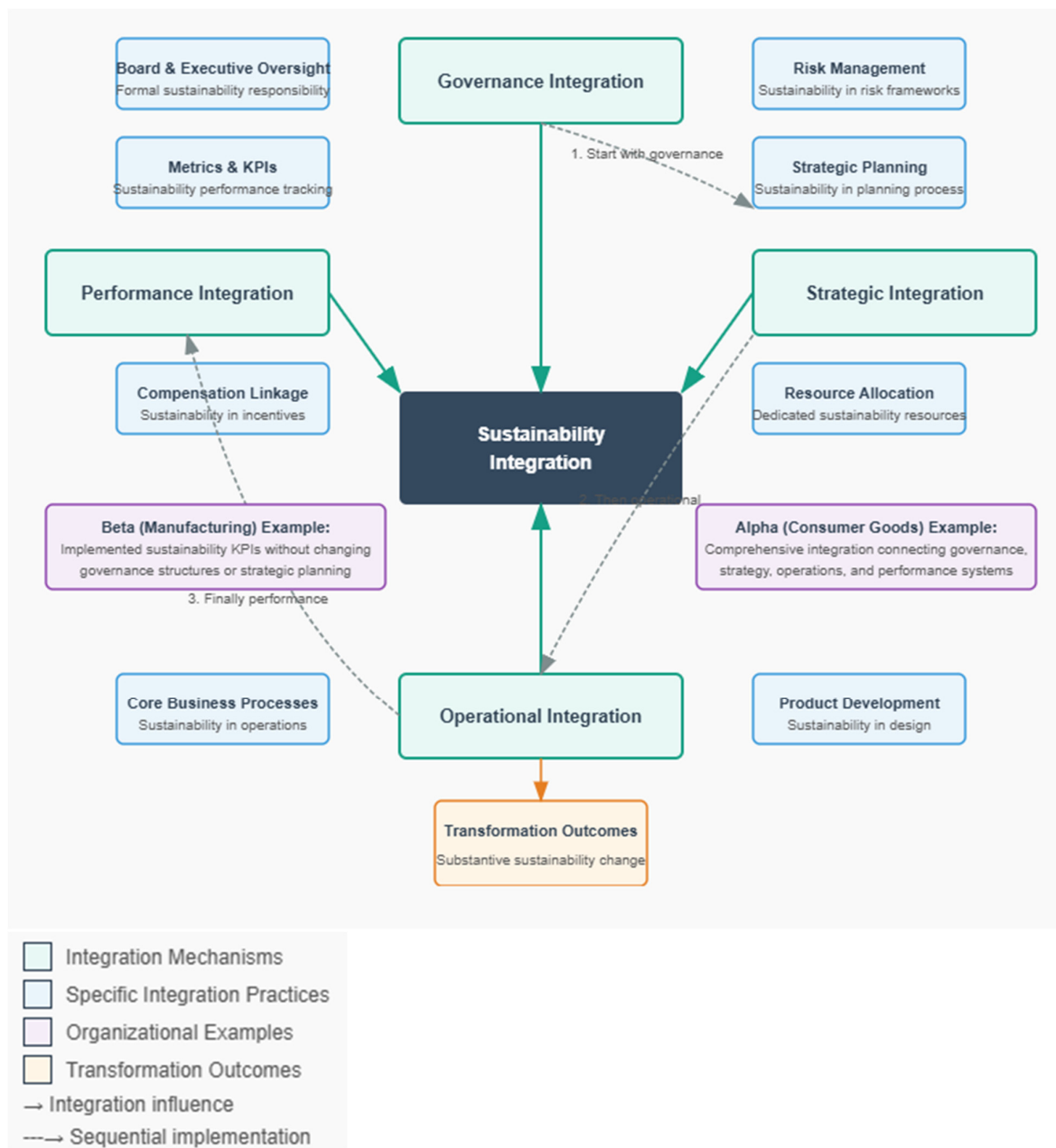


Figure 4. Integration Mechanisms for Embedding Sustainability.

Effective integration mechanisms included:

- Governance integration: Sustainability oversight at board and executive levels
- Strategic integration: Sustainability embedded in strategic planning and goal-setting
- Operational integration: Sustainability incorporated into core business processes
- Performance integration: Sustainability metrics linked to compensation and advancement

Case study data revealed that these integration mechanisms were most effective when implemented as coordinated systems rather than isolated practices. This was particularly evident in the contrast between Alpha and Beta:

"Alpha implemented a comprehensive integration approach that connected governance, strategy, operations, and performance systems. Sustainability considerations flowed coherently from board-level discussions through strategic planning and into operational decisions. In contrast, Beta implemented sustainability KPIs without changing governance structures or strategic planning processes, resulting in disconnected initiatives that struggled to gain traction." (Case Study Analysis)

The temporal sequence of integration also emerged as important. Gamma (Financial Services) found that beginning with strategic integration created a foundation for subsequent operational changes:

"We started by integrating sustainability into our strategic planning process. This created the mandate for operational changes, which then required performance metrics to drive accountability. Trying to implement performance metrics without the strategic foundation didn't work." (Gamma, Executive)

This finding aligns with the quantitative result showing stronger effects of integration in more advanced organizations, suggesting that integration creates compound benefits as it matures and expands throughout organizational systems.

Our analysis also revealed different integration pathways across organizational types. While large incumbents typically pursued formal integration through established management systems, entrepreneurial organizations often built integrated approaches from inception:

"As a purpose-driven startup, we didn't need to integrate sustainability into our existing systems—we designed our systems around sustainability from the beginning. Our challenge wasn't integration but maintaining this integrated approach as we scaled." (Epsilon, Founder)

These different pathways highlight the importance of tailoring integration approaches to organizational context rather than applying universal best practices.

Integration also faced significant implementation challenges, particularly in organizations with complex legacy systems or significant internal resistance:

"The hardest part of integration wasn't the technical aspects but overcoming entrenched interests and established routines. We had to recognize that integration isn't just a structural challenge but a political and cultural one." (Delta, Sustainability Director)

This observation connects integration practices to power dynamics, explaining the significant interaction effect found in the quantitative analysis.

4.2.3. Power Dynamics in Transformation Processes

Change agents consistently identified power dynamics as critical to transformation outcomes. Our analysis revealed that power operates through multiple dimensions in sustainability contexts, including formal authority, resource control, expertise, and discursive influence. Successful change agents developed sophisticated capabilities for navigating these different power dimensions.

As one sustainability director explained:

"Understanding the power landscape is essential. I've learned to map who has decision-making authority, who influences those decision-makers, and who might resist change. This mapping helps me develop targeted strategies for different stakeholders." (Participant 7, Manufacturing)

Successful change agents employed various strategies to navigate power dynamics:

- Strategic framing: Articulating sustainability in terms that resonated with powerful stakeholders' priorities
- Coalition building: Creating networks of support across organizational boundaries
- Resource mobilization: Securing financial, human, and symbolic resources
- Timing exploitation: Identifying and leveraging windows of opportunity

These strategies were particularly important in organizations where sustainability values weren't deeply institutionalized:

"In our organization, sustainability isn't yet part of the core business model. I have to be strategic about when and how I introduce sustainability considerations. I've found that connecting them to cost savings, risk reduction, or customer expectations gets much more traction than environmental arguments alone." (Participant 23, Financial Services)

The qualitative data also revealed that power dynamics weren't static but evolved throughout transformation processes. As initiatives demonstrated value, sustainability advocates often gained additional influence:

"Five years ago, we were begging for a seat at the table. Now business units come to us proactively because they've seen how sustainability initiatives create value. Success has given us credibility and influence we didn't have before." (Participant 15, Manufacturing)

This temporal evolution helps explain the quantitative finding that power mobilization has different effects across organizational contexts. In some contexts, power mobilization is critical for initiating transformation; in others, it becomes more important for maintaining momentum and overcoming resistance.

Our analysis also revealed significant power asymmetries that constrained transformation, particularly regarding global supply chains and relationships with marginalized stakeholders:

"We've made progress internally, but our most significant sustainability impacts are in our supply chain where our influence is limited. Building power to affect these broader systems remains our biggest challenge." (Participant 29, Retail)

These persistent power asymmetries highlight limitations in current sustainability approaches and point to the need for more systemic transformation strategies that address fundamental power structures.

Additionally, digital technologies emerged as increasingly important tools for power mobilization across our case organizations. As one sustainability director explained:

"Digital platforms have fundamentally changed how we mobilize support for sustainability initiatives. Our sustainability dashboard creates transparency around environmental metrics that previously weren't visible to most employees. This visibility has democratized access to information and enabled more people to participate meaningfully in sustainability conversations, creating a broader power base for change." (Participant 14, Technology)

The strategic use of digital tools varied across organizational contexts. In knowledge-intensive organizations, digital collaboration platforms facilitated coalition building across traditional boundaries:

"Our company-wide digital collaboration platform allows sustainability champions to connect across geographical and departmental boundaries. This has been transformative for building coalitions—people who would never have connected in the traditional hierarchy now share ideas and coordinate actions. It's created a distributed network of change agents that's much harder to dismiss than isolated sustainability advocates." (Gamma, Innovation Lead)

In manufacturing contexts, digital tools were more often used to make the business case through data visualization:

"Our predictive analytics system has become a powerful tool for influence. When we can show in real-time how sustainability investments affect operational efficiency, quality metrics, and risk exposure, we shift from making values-based arguments to evidence-based ones. This has completely changed conversations with operations and finance leaders." (Beta, Sustainability Manager)

These examples illustrate how digital technologies can reshape power dynamics by democratizing information access, enabling new coalition formations, and strengthening evidence-based influence strategies.

4.2.4. Learning Systems for Sustainability

Organizations with strong transformation outcomes implemented systematic approaches to learning that connected individual, group, and organizational levels. Our analysis revealed that effective learning for sustainability differs from conventional organizational learning in its integration of diverse knowledge types, explicit attention to power dynamics, and focus on system transformation.

"We've developed a multi-level learning system for sustainability. Individual employees participate in sustainability training and have personal development goals. Teams have regular reflection sessions to discuss what's working and what isn't. At the organizational level, we have quarterly reviews where we assess overall progress and adjust our approach." (Participant 31, Healthcare)

Effective learning systems included:

- Psychological safety: Creating environments where people felt safe discussing failures
- Feedback mechanisms: Developing robust approaches to monitoring and assessment
- Reflection practices: Institutionalizing regular reflection on experience
- Knowledge management: Creating systems to capture and share learning

Delta (Healthcare) demonstrated a particularly robust learning system:

"Delta implemented a formal 'sustainability learning cycle' with quarterly review and reflection processes. Each review examined outcomes against goals, identified barriers to progress, and generated insights for improvement. These insights were documented in a knowledge management system accessible to all employees and incorporated into future planning." (Case Study Analysis)

The case studies revealed that double-loop learning—questioning fundamental assumptions—was particularly important for transformative change. Gamma (Financial Services) demonstrated this approach:

"When our initial sustainability efforts produced limited results, we didn't just adjust our methods—we questioned our underlying assumptions about the relationship between sustainability and our business model. This deeper reflection led to fundamental changes in how we defined our purpose and strategy, enabling much more significant transformation." (Gamma, Executive)

This finding helps explain the strong quantitative relationship between learning mechanisms and transformation outcomes. Organizations that developed robust learning systems were able to continuously adapt their approaches based on experience, accelerating transformation over time.

However, our analysis also revealed significant barriers to effective learning, including time pressures, defensive routines, and power dynamics that constrained open dialogue:

"The biggest barrier to learning isn't lack of information but lack of time and space for reflection. When everyone is focused on delivering results, stepping back to question assumptions becomes a luxury few can afford." (Participant 4, Consulting)

These barriers were particularly evident in organizations facing significant market pressures or operating in turbulent environments, highlighting the tension between short-term performance demands and the reflective practices necessary for transformative learning.

Additionally, digital knowledge management systems played a crucial role in accelerating learning across all transformation stages. Organizations with more sophisticated digital learning infrastructures demonstrated faster capability development and more consistent implementation. At Gamma, the implementation of an AI-enhanced knowledge management system transformed how sustainability learning was captured and disseminated:

"Our digital knowledge platform doesn't just store information—it actively connects people with relevant sustainability insights based on their roles and current challenges. When someone enters a new sustainability-related project, the system automatically suggests relevant case studies, expert contacts, and lessons learned from similar initiatives. This dramatically accelerates learning cycles and prevents repeated mistakes." (Gamma, Knowledge Manager)

The most effective digital learning systems integrated four key elements: (1) accessible repositories of sustainability knowledge; (2) collaboration tools that connected practitioners across boundaries; (3) analytics capabilities that identified patterns and insights; and (4) personalization features that delivered relevant knowledge to users based on their context and needs. Organizations with all four elements demonstrated significantly faster capability development than those with more fragmented approaches.

4.3. Contextual Contingencies of Transformation

The qualitative data revealed significant contextual contingencies that explained variation in quantitative relationships across organizational types and sectors. These contingencies highlight how sustainability transformation approaches must be tailored to specific contexts rather than following universal prescriptions.

The qualitative data revealed how these contextual factors shaped transformation approaches. Ownership structure significantly influenced transformation pathways, with publicly traded companies facing distinct challenges:

"As a public company, quarterly earnings pressure creates a constant tension with longer-term sustainability investments. We've had to develop specific approaches to manage this tension, including dedicated innovation funds that protect longer-term initiatives from short-term pressures." (Alpha, Executive)

In contrast, Epsilon's social enterprise structure created different dynamics:

"Our legal structure as a benefit corporation fundamentally shapes our approach to sustainability. It's built into our governance, with directors legally required to consider social and environmental impacts alongside financial returns. This creates institutional support for sustainability that most conventional companies lack." (Epsilon, Director)

Sectoral dynamics created distinct transformation pathways. Manufacturing organizations typically emphasized operational efficiency and product innovation:

"In manufacturing, our sustainability transformation focused heavily on resource efficiency, circular material flows, and product redesign. These tangible aspects provided clear business cases that helped overcome resistance." (Beta, Manager)

Service organizations, by contrast, focused more on human capital and digital transformation:

"As a service business, our biggest sustainability impacts relate to our people and our digital infrastructure. Our transformation emphasized employee well-being, inclusive culture, and digital technologies that reduce environmental impact while enhancing service quality." (Gamma, Director)

The stronger effect of paradox navigation in manufacturing ($\beta=0.38$) compared to services ($\beta=0.24$) warrants deeper explanation beyond simply citing 'complex material trade-offs.' Our further analysis suggests three factors that better account for this difference. First, the visibility and measurability of tensions in manufacturing contexts makes paradoxes more concrete and therefore more amenable to deliberate navigation strategies. In service organizations, sustainability tensions often manifest in more diffuse and less tangible ways, making them harder to identify and address systematically.



Figure 5. Contextual Contingencies of Sustainability Transformation.

Key Insights:

- *Large incumbents benefit most from learning systems but struggle with integration practices*
- *Entrepreneurial organizations excel at integration but face challenges with power mobilization*
- *B2C sectors show high effectiveness with power mobilization strategies, leveraging consumer pressure*
- *Global organizations require strong learning systems and power mobilization to manage complexity*
- *Paradox navigation is most effective in public sector contexts where multiple stakeholder demands are common*

Second, manufacturing organizations typically have more established process improvement methodologies (e.g., lean manufacturing, Six Sigma) that provide structured frameworks for paradox navigation once sustainability tensions are recognized. Our interviews with manufacturing leaders revealed how they adapted existing problem-solving approaches to address sustainability paradoxes, whereas service organization leaders often lacked comparable methodological foundations.

Third, the regulated nature of many manufacturing processes means that sustainability tensions frequently emerge as explicit compliance versus innovation trade-offs, creating clear opportunities to apply paradox navigation approaches. In contrast, service organizations more often experience sustainability tensions as diffuse stakeholder expectations that are harder to frame as specific paradoxes requiring navigation.

Geographic and cultural contexts also shaped transformation approaches:

"In our Asian operations, hierarchical cultural norms significantly influence how sustainability initiatives must be introduced and implemented. Leadership endorsement is essential, and initiatives must respect hierarchical structures while still enabling participation." (Participant 39, Manufacturing)

These contextual contingencies help explain the quantitative finding that different capabilities have varying effects across organizational contexts. They also highlight the importance of tailoring sustainability approaches to specific contexts rather than applying universal best practices.

4.4. Temporal Dynamics of Transformation

Our longitudinal case studies revealed important temporal dynamics in sustainability transformation processes that help explain the quantitative relationships between capabilities and outcomes. These dynamics included capability development pathways, transformation phases, and evolution of integration mechanisms over time.

To provide greater precision regarding transformation phases, we identified specific markers that signaled transitions between stages. Early transformation was characterized by: (1) initial recognition of sustainability tensions without systematic response mechanisms; (2) isolated sustainability initiatives lacking integration with core business functions; and (3) primarily compliance-driven approaches. Transition to advancing transformation was marked by: (1) establishment of formal sustainability governance structures; (2) development of strategic sustainability objectives aligned with business goals; and (3) implementation of systematic sustainability measurement systems. Leading transformation organizations demonstrated: (1) proactive paradox navigation approaches embedded in decision-making processes; (2) comprehensive integration across all organizational systems; and (3) innovation-driven sustainability initiatives that created new market opportunities.

Our longitudinal case analysis revealed that these transitions typically occurred over 3-5 year periods, with paradox navigation capabilities developing approximately 12-18 months before comprehensive integration mechanisms in most cases. Organizations that attempted to implement integration mechanisms without first developing paradox navigation capabilities often experienced implementation challenges due to unresolved tensions between competing objectives.

Capability development followed different pathways across organizations. In some cases, paradox navigation capabilities developed first, creating foundation for subsequent integration:

"We had to develop comfort with sustainability tensions before we could effectively integrate sustainability into our systems. Attempts at integration without this foundation created resistance and superficial implementation." (Alpha, Manager)

In other cases, initial integration efforts catalyzed development of paradox navigation capabilities:

"As we began integrating sustainability metrics into performance reviews, tensions became visible that had previously been hidden. This forced us to develop better approaches to navigating these tensions." (Delta, HR Director)

These different pathways suggest that while the quantitative model identified relationships between capabilities and outcomes, these relationships may operate through different causal sequences depending on organizational context and history.

Transformation processes also displayed distinct phases, with different capabilities proving critical at different stages:

"In early phases, power mobilization was essential for getting sustainability on the agenda. In middle phases, paradox navigation became critical as we encountered complex implementation challenges. In later phases, integration mechanisms became most important for embedding sustainability into how we operate." (Gamma, Sustainability Director)

This phased progression helps explain the quantitative finding that paradox navigation had stronger effects for organizations at earlier transformation stages, while integration had stronger effects for more advanced organizations.

Integration mechanisms also evolved over time, typically beginning with isolated practices before developing into more coordinated systems:

"Our integration journey began with individual champions integrating sustainability into their specific domains. Over time, these isolated efforts connected into more systematic approaches, creating reinforcing cycles across governance, strategy, operations, and performance systems." (Alpha, Executive)

This evolution helps explain the stronger quantitative effects of integration in more advanced organizations, as integration benefits compound as practices become more coordinated and comprehensive.

5. Discussion

5.1. Paradox Navigation as a Core Sustainability Capability

This research contributes to sustainability science by empirically demonstrating the relationship between paradox navigation capabilities and transformation outcomes. Organizations that develop structured approaches to engaging with sustainability tensions achieve better outcomes than those seeking to eliminate these tensions or force false choices. This finding supports Smith and Lewis's [7] dynamic equilibrium model of organizing but extends it by identifying specific practices that enable productive engagement with paradoxes in sustainability contexts.

The significant relationship between paradox navigation capabilities and transformation outcomes ($\beta=0.31$, $p<0.01$) provides empirical support for theoretical arguments about the importance of paradox approaches to sustainability [13, 14]. The qualitative findings extend this understanding by revealing specific mechanisms through which organizations develop and institutionalize paradox navigation capabilities, including acceptance practices, both/and thinking, creative synthesis, and structural support.

Our findings advance paradox theory in three important ways. First, we move beyond conceptual models of paradox types to identify specific practices organizations use to navigate these paradoxes in sustainability contexts. This practical focus provides a bridge between abstract paradox theory and concrete organizational challenges.

Second, we demonstrate that paradox navigation requires both cognitive capabilities (ways of thinking about tensions) and structural supports (processes and systems that enable engagement with tensions). This dual nature helps explain why paradox capabilities develop unevenly across organizations and points to potential development pathways.

Third, we identify important boundary conditions for paradox approaches, showing how their effectiveness varies across organizational contexts and transformation stages. The stronger relationship between paradox navigation and transformation outcomes in manufacturing organizations and in earlier transformation stages suggests that paradox capabilities may be particularly important in contexts with more visible tensions and less established sustainability approaches.

These contributions have important implications for sustainability science, suggesting that addressing complex sustainability challenges requires approaches that accommodate rather than eliminate tensions. By developing capabilities to work productively with sustainability paradoxes, organizations may achieve more substantive transformations that address multiple objectives simultaneously rather than privileging certain sustainability dimensions over others.

However, our findings also suggest potential limitations of paradox approaches for sustainability transformation. While paradox navigation enables more creative solutions to organizational tensions, it may not adequately address fundamental system contradictions that require more radical transformation. This critique aligns with concerns raised by Hahn and Figge [23] that paradox approaches may inadvertently sustain unsustainable systems by accommodating rather than challenging their fundamental contradictions.

Future research should investigate this tension between paradoxical accommodation and system transformation, examining how organizations might combine paradox navigation with more radical approaches to address systemic sustainability challenges.

5.2. Integration Mechanisms for Embedding Sustainability

The findings identify integration practices as the strongest predictor of sustainability transformation outcomes ($\beta=0.42$, $p<0.01$), demonstrating the importance of embedding

sustainability throughout organizational systems rather than treating it as a specialized function. This research advances understanding of sustainability integration by identifying four specific integration mechanisms—governance, strategic, operational, and performance integration—and demonstrating their collective importance for substantive transformation.

The finding that integration practices are the strongest predictor of transformation outcomes ($\beta=0.42$, $p<0.01$) can be explained through a systems theory lens. Integration creates what complex systems theorists call "emergent properties"—outcomes that cannot be predicted from individual components alone but arise from their interactions [61]. Our qualitative data revealed three specific system dynamics that produce these non-linear effects: (1) reinforcing feedback loops, where integration in one domain (e.g., governance) creates positive signals that accelerate integration in others (e.g., operations); (2) threshold effects, where integration must reach a critical mass across multiple organizational subsystems before transformation gains become visible; and (3) network effects, where the value of integration increases exponentially as more organizational functions participate in the sustainability agenda.

For example, at Gamma Corporation, the implementation of an integrated performance management system that incorporated sustainability metrics created a reinforcing feedback loop by influencing resource allocation decisions at the governance level, which subsequently accelerated the adoption of sustainable practices at the operational level. This cascading effect, characteristic of complex adaptive systems, explains why partial integration efforts often produce limited results, while comprehensive integration generates disproportionate benefits through system-wide synergies.

Viewing integration mechanisms through a systems lens also helps explain the significant interaction between power mobilization and integration practices ($\beta=0.19$, $p<0.01$). Power mobilization functions as a system enabler that alters the dynamics between integration mechanisms by changing the flow of resources, information, and legitimacy throughout the organizational system. This finding demonstrates that structural interventions are insufficient without attention to the power relationships that govern system dynamics.

This contribution extends previous research on sustainability integration [24, 27] in several important ways. First, we specify the mechanisms through which integration occurs and demonstrate their relative effectiveness across diverse organizational contexts. Our finding that integration practices have more consistent effects across organizational sizes than other capabilities suggests their fundamental importance regardless of scale.

Second, our qualitative findings reveal that these mechanisms are most effective when implemented as coordinated systems rather than isolated practices, with strategic integration typically preceding operational and performance integration. This sequential understanding advances previous research that has often treated integration as a static condition rather than a developmental process.

Third, our identification of different integration pathways across organizational types—formal systems integration in incumbents versus built-in integration in entrepreneurial organizations—highlights the importance of contextually-tailored integration approaches. This finding challenges universal prescriptions for sustainability integration and suggests that effective approaches must align with organizational history and structure.

The significant interaction between power mobilization and integration practices ($\beta=0.19$, $p<0.01$) demonstrates that structural interventions are insufficient without attention to power relationships. This finding extends previous research by highlighting the importance of addressing both structural and political dimensions of sustainability integration.

These contributions have important implications for sustainability science, suggesting that addressing the gap between sustainability rhetoric and substantive action requires comprehensive integration approaches that embed sustainability throughout organizational systems. By implementing coordinated integration mechanisms that evolve over time, organizations may overcome the compartmentalization that often limits sustainability impact.

However, our findings also reveal potential limitations of integration approaches. While integration can embed sustainability within existing organizational systems, it may struggle to transform those systems when they are fundamentally misaligned with sustainability principles. This limitation was particularly evident in organizations with business models that create inherent tensions with sustainability objectives.

Future research should investigate how integration approaches might be combined with more transformative strategies that question and reshape underlying business models and organizational purposes. Such research could help address the tension between embedding sustainability within existing systems and transforming those systems to be inherently more sustainable.

5.3. Power Dynamics and Sustainability Transformation

This research advances understanding of power in sustainability transformations by demonstrating how power operates as both a constraint and enabler of change. The findings reveal that power mobilization has a significant direct effect on transformation outcomes ($\beta=0.27$, $p<0.01$) and moderates the effectiveness of integration practices.

Our finding that government support significantly strengthens the relationship between paradox navigation capabilities and transformation outcomes ($\beta=0.41$ vs. $\beta=0.23$) demonstrates how external power structures reshape internal organizational dynamics. Government policies provide legitimacy to sustainability advocates, creating what Avelino [62] describes as "transformative power"—the capacity to change existing power structures rather than merely working within them. This effect was particularly evident in highly regulated industries, where government support functioned as institutional scaffolding that legitimized paradoxical approaches to sustainability challenges that might otherwise have been dismissed as unrealistic or impractical.

The varying effects of power mobilization across organizational contexts—stronger in service organizations ($\beta=0.35$) than manufacturing ($\beta=0.22$) and stronger in Asian organizations ($\beta=0.35$) than North American ($\beta=0.22$) or European organizations ($\beta=0.25$)—highlight how power operates differently across contexts. These differences suggest that power-conscious approaches to sustainability must be tailored to specific cultural and sectoral dynamics.

Power dynamics also significantly influence inter-organizational relationships, particularly in supply chains where sustainability transformations often require coordinated action across organizational boundaries. Our findings extend Wang and Zhang's [31] work on inter-organizational cooperation in digital green supply chains by identifying how power asymmetries constrain transformation and how digital technologies can help rebalance power relationships. Organizations that successfully transformed their supply chains developed what we term "inter-organizational integration mechanisms"—systems and processes that created shared accountability, mutual benefits, and collaborative innovation across organizational boundaries.

As one executive in our study explained:

"We shifted from using our purchasing power to demand compliance to using our technological capabilities to enable collaboration. By implementing shared digital platforms that created transparency across our supply chain, we transformed a power-over relationship into a power-with dynamic that accelerated sustainability innovation."

This perspective aligns with Wang and Zhang's [31] finding that technological, organizational, and human elements function as mutually reinforcing drivers of inter-organizational cooperation. Our research extends this understanding by demonstrating how these elements specifically reshape power dynamics to enable system-level transformation rather than merely organizational-level change.

The qualitative findings extend theoretical understanding of power in sustainability contexts [17, 62] in three important ways. First, we identify specific strategies through which change agents navigate and reshape power relationships to advance sustainability initiatives. These strategies—strategic framing, coalition building, resource mobilization, and timing exploitation—provide

practical approaches for working with power rather than simply analyzing it as a structural constraint.

Second, our findings reveal how power dynamics evolve throughout transformation processes, with sustainability advocates gaining influence as they demonstrate value and build coalitions. This temporal dimension adds nuance to existing theoretical perspectives [30] by highlighting the dynamic nature of power relationships in sustainability transformations.

Third, our identification of persistent power asymmetries that constrain transformation, particularly regarding global supply chains and marginalized stakeholders, highlights limitations in current sustainability approaches. This finding contributes to critical perspectives on sustainability by demonstrating how power structures may undermine transformative potential.

The institutional logics prevalent in different sectors created distinct patterns of enablers and barriers for sustainability transformation. Manufacturing organizations operated within institutional fields where technical-market logics dominated, creating environments where sustainability initiatives gained traction primarily when framed in terms of efficiency, risk reduction, and competitive advantage:

"In our sector, sustainability transformation accelerated when we stopped talking about 'doing good' and started demonstrating how our approach reduced costs, mitigated supply chain risks, and created product differentiation. The technical-market logic that dominates our industry isn't inherently opposed to sustainability—it just requires translation into terms that resonate with that logic." (Beta, Executive)

In contrast, service organizations, particularly those in healthcare, education, and social services, operated within institutional fields where professional and community logics provided more natural alignment with certain aspects of sustainability:

"Our professional ethos of care created natural receptivity to the social dimensions of sustainability. The challenge was expanding this care ethic to include environmental considerations and helping professionals see the connections between environmental health and human wellbeing." (Delta, Chief Medical Officer)

Public sector organizations navigated the most complex institutional environments, operating simultaneously within state, market, and community logics with shifting political priorities:

"We constantly navigate conflicting institutional demands—political pressures for short-term results, bureaucratic requirements for procedural conformity, public expectations for both service quality and cost containment, and now sustainability considerations. Successfully advancing sustainability requires finding pathways that satisfy multiple institutional demands simultaneously." (Zeta, Director)

These contributions have important implications for sustainability science, suggesting that addressing power dynamics is essential for substantive sustainability transformation. By developing power-conscious approaches that navigate and reshape power relationships, change agents may overcome resistance and create conditions more conducive to sustainability innovations.

However, our findings also suggest limitations in current approaches to power in sustainability contexts. While organizational change agents can navigate power dynamics to advance sustainability within organizational boundaries, their ability to address broader systemic power arrangements remains limited. This constraint highlights the need for multi-level approaches that connect organizational change with broader system transformation.

Future research should investigate how organizational power dynamics interact with broader power structures in society, and how change agents might work across these levels to create more fundamental sustainability transformations. Such research could help address the tension between working within existing power structures and transforming those structures to enable more sustainable futures.

5.4. Contextual Contingencies and Tailored Sustainability Approaches

This research advances understanding of contextual contingencies in sustainability transformation by demonstrating significant differences in relationships across sectors, sizes, and geographic contexts. When viewed through a systems thinking lens, these contextual variations represent different system parameters that fundamentally alter the dynamics between organizational capabilities and transformation outcomes.

Government support emerged as a particularly significant system parameter that moderated the effectiveness of paradox navigation capabilities ($\beta=0.41$ with strong support vs. $\beta=0.23$ with limited support). This moderating effect demonstrates how system-level factors create enabling conditions that amplify the effectiveness of organizational capabilities through multiple reinforcing mechanisms. First, government support provides legitimacy that reduces internal resistance to paradoxical approaches. Second, it creates resources that enable more comprehensive implementation of integration mechanisms. Third, it establishes institutional scaffolding that guides decision-making under conditions of uncertainty.

Table 8. Transformation Patterns Across Organizational Contexts.

Organizational Context	Dominant Transformation Approach	Critical Success Factors	Key Challenges	Illustrative Example
Large Incumbents	Systematic integration	Executive sponsorship, Formal governance, Resource commitment	Cultural inertia, Competing priorities, System complexity	Alpha's comprehensive integration connecting governance, strategy, operations, and performance systems
Entrepreneurial	Purpose-driven culture	Mission alignment, Founder commitment, Stakeholder relationships	Resource constraints, Scaling impact, Maintaining values	Epsilon's challenge maintaining integrated approach while scaling operations
Public Sector	Policy-driven change	Political mandate, Stakeholder engagement, Regulatory alignment	Political cycles, Resource constraints, Bureaucratic processes	Zeta's collaborative approach connecting public policy with private implementation
B2C Sectors	Brand-driven initiatives	Consumer pressure, Reputational concerns, Market differentiation	Authenticity perceptions, Value chain complexity, Measurement challenges	Alpha's focus on consumer-facing sustainability initiatives that built brand equity
B2B Sectors	Client and regulation-driven	Client requirements,	Limited market pressure, Technical	Beta's emphasis on compliance and

Organizational Context	Dominant Transformation Approach	Critical Success Factors	Key Challenges	Illustrative Example
		Industry standards, Efficiency gains	complexity, Investment horizons	efficiency in the absence of consumer pressure
Global Organizations	Centralized strategy with local adaptation	Strong governance, Contextual flexibility, Knowledge transfer	Contextual variation, Competing priorities, Implementation consistency	Gamma's challenge balancing global standards with local adaptation across diverse markets

This finding has significant implications for both theory and practice. Theoretically, it demonstrates that organizational capabilities do not operate in isolation but are embedded within broader institutional systems that can either amplify or dampen their effectiveness. Practically, it suggests that organizations in regions with limited policy support must invest more heavily in internal capability development and power mobilization to achieve comparable transformation outcomes.

The significant variations in capability effectiveness across organizational contexts highlight the need for systems-oriented approaches that recognize the dynamic interplay between organizational capabilities, integration mechanisms, power relationships, and external contextual factors. Rather than viewing these elements as separate variables, our research demonstrates the value of conceptualizing them as interconnected components of a complex adaptive system where interventions in one area create ripple effects throughout the entire system.

This typology of transformation patterns illustrates how organizational context shapes sustainability approaches and outcomes. Each context presents a distinct configuration of enablers, barriers, and effective practices rather than a universal transformation pathway. Large incumbents typically pursue systematic integration through formal governance structures and management systems, but face challenges of cultural inertia and competing priorities that can dilute transformation efforts. Entrepreneurial organizations leverage purpose-driven cultures and founder commitment to embed sustainability from inception, but struggle with scaling these approaches as they grow. Public sector organizations benefit from policy mandates and regulatory alignment but must navigate political cycles and bureaucratic constraints. The contrast between B2C sectors (leveraging consumer pressure and brand value) and B2B sectors (driven by client requirements and efficiency gains) highlights how market position shapes transformation incentives and approaches. Global organizations must balance the benefits of centralized governance with the need for local adaptation across diverse operating contexts. These patterns demonstrate why contextually-tailored approaches to sustainability transformation are essential—effective practices in one context may prove ineffective or counterproductive in another.

This contribution responds to calls for more contextualized understanding of sustainability transformations [43, 44] in several important ways. First, our empirical demonstration of how organizational context shapes both the process and outcomes of transformation challenges universal prescriptions for sustainability transformation and suggests the need for contextually tailored approaches.

Second, our identification of different transformation pathways across organizational types—systematic integration in large incumbents, purpose-driven approaches in entrepreneurial organizations, policy-driven change in public sector, brand-driven initiatives in B2C sectors, and

client-driven approaches in B2B sectors—highlights how context shapes not only the effectiveness of specific practices but the overall transformation approach.

Third, our finding that different capabilities have varying effects across organizational contexts—paradox navigation more important in manufacturing, power mobilization more important in services—provides empirical support for contingency perspectives on sustainability capabilities. This finding suggests that capability development should prioritize different areas depending on organizational context.

The quantitative finding that different capabilities have varying effects at different transformation stages—paradox navigation more important at earlier stages, integration more important at later stages—further highlights the dynamic nature of contextual contingencies. This temporal dimension suggests that sustainability approaches should evolve as organizations progress in their transformation journeys.

These contributions have important implications for sustainability science, suggesting that effective sustainability approaches are not universal but must be adapted to specific contextual conditions. By developing context-sensitive transformation strategies, organizations may achieve more substantive sustainability outcomes that address their particular sustainability challenges and opportunities.

However, our findings also suggest potential limitations of overly contextual approaches. While tailoring is important, certain principles—such as the importance of integration mechanisms and learning systems—showed relatively consistent effects across contexts. This consistency suggests the existence of common principles that transcend contextual variation.

Future research should further investigate the balance between contextual adaptation and universal principles in sustainability transformation, seeking to identify which aspects of transformation require tailoring and which remain consistent across contexts. Such research could help develop more nuanced frameworks that guide contextual adaptation while maintaining core transformation principles.

5.5. Institutional Logics and Competing Demands

Our findings contribute to institutional theory by demonstrating how organizations navigate competing institutional logics in sustainability contexts. The paradox navigation capabilities identified in our research represent practical approaches to managing institutional complexity, while integration mechanisms provide structural supports for working across logics.

Organizations achieving substantive sustainability transformations developed capabilities to work across market, community, and ecological logics rather than privileging one logic or compartmentalizing them. As one executive explained:

"We had to move beyond seeing business and sustainability as separate worlds with different rules. Success required integrating market thinking with ecological understanding and community perspectives into a coherent approach that draws from all three." (Alpha, Executive)

This integration of logics aligns with recent work on institutional hybridization [63] but extends it by identifying specific practices organizations use to create hybrid approaches in sustainability contexts. Our findings suggest that successful hybridization requires both cognitive capabilities (paradox navigation) and structural supports (integration mechanisms).

The varying effects of paradox navigation across organizational contexts may reflect different levels of institutional complexity. Manufacturing organizations, which showed stronger effects for paradox navigation ($\beta = 0.38$, $p < 0.01$), typically face more complex material trade-offs and competing stakeholder demands than service organizations ($\beta = 0.24$, $p < 0.05$).

These contributions have important implications for institutional theory, suggesting that organizations can develop specific capabilities for managing institutional complexity rather than being passive recipients of institutional pressures. By developing paradox navigation capabilities and implementing integration mechanisms, organizations may create novel hybrid arrangements that advance sustainability while maintaining legitimacy across diverse institutional domains.

Future research should further investigate how institutional logics shape sustainability transformation processes, particularly how organizations might reshape rather than merely navigate institutional arrangements. Such research could help address the tension between working within existing institutional frameworks and transforming those frameworks to enable more sustainable futures.

5.6. Practical Implications for Sustainable Organizations

The findings have several practical implications for organizations seeking to advance sustainability transformations. Organizations seeking to develop paradox navigation capabilities can implement specific practices that proved effective in our case studies:

1. Establish regular 'paradox dialogue sessions' where cross-functional teams identify and discuss sustainability tensions without pressure for immediate resolution, as successfully implemented at Alpha Corporation.
2. Train managers in specific both/and thinking techniques, such as the 'polarity mapping' exercise used by Gamma Corporation, which visually charts the benefits and drawbacks of focusing exclusively on either pole of a paradox.
3. Create dedicated innovation forums focused on creative synthesis of competing demands, structured around the 'integrative solution workshops' pioneered by Delta Corporation, where cross-functional teams use design thinking approaches to develop solutions that address multiple objectives simultaneously.
4. Implement structural supports for paradox navigation through 'tension owner' roles, as established at Epsilon Corporation, where specific individuals are responsible for ensuring that key sustainability tensions receive ongoing attention rather than being resolved prematurely.

Organizations should also focus on implementing comprehensive integration mechanisms rather than isolated sustainability initiatives:

1. Develop a comprehensive integration approach that connects governance, strategy, operations, and performance systems. Begin with strategic integration to create the foundation for operational changes, which then require performance metrics for accountability.
2. Address power dynamics explicitly by mapping the power landscape, building coalitions across organizational boundaries, and framing sustainability initiatives in terms that resonate with key decision-makers' priorities.
3. Invest in multi-level learning systems that connect individual, group, and organizational learning. Create psychological safety for discussing failures, implement regular reflection processes, and develop knowledge management systems that capture and share sustainability insights.

4. Tailor approaches to organizational context rather than applying universal best practices. Consider how sector, size, history, and institutional position shape the most appropriate transformation strategies.
5. Recognize the temporal dynamics of transformation, with different capabilities becoming more critical at different stages. Develop paradox navigation capabilities early to create the foundation for integration, while building learning systems that enable continuous adaptation as transformation progresses.
6. Balance incremental improvement with transformative change by embedding sustainability within existing systems while continuously questioning whether those systems themselves need transformation to become inherently more sustainable.

These practical recommendations offer concrete guidance based on empirical findings from organizations that have successfully navigated sustainability transformations across diverse contexts.

6. Conclusions

6.1. Key Contributions

This study makes three primary theoretical contributions. First, we advance paradox theory by empirically demonstrating how specific capabilities—acceptance, both/and thinking, and creative synthesis—enable organizations to navigate sustainability tensions productively rather than defensively. Second, we identify four integration mechanisms that translate paradoxical thinking into organizational practice, showing how governance, strategic, operational, and performance integration create reinforcing cycles that embed sustainability throughout organizational systems. Third, we reveal the critical moderating role of power mobilization in sustainability transformation, demonstrating how the strategic framing of sustainability initiatives and coalition building significantly enhance the effectiveness of both paradox navigation and integration mechanisms.

By integrating these findings within a systems thinking framework, our research provides a more dynamic understanding of sustainability transformation as a complex adaptive process where capabilities, mechanisms, and contextual factors interact through feedback loops, emergent properties, and non-linear relationships. This systems perspective explains why piecemeal approaches to sustainability often fail while integrated approaches that address multiple system elements simultaneously produce more substantive transformation.

Our findings on the moderating role of government support demonstrate how system-level parameters fundamentally alter the dynamics between organizational capabilities and transformation outcomes. This insight extends institutional theory by showing how external institutional factors not only exert isomorphic pressures but also function as enabling conditions that amplify the effectiveness of internal organizational capabilities.

Additionally, our research extends understanding of inter-organizational dynamics in sustainability transformation by demonstrating how power relationships across organizational boundaries—particularly in supply chains—significantly influence transformation outcomes. By identifying how digital technologies can reshape these power dynamics to enable more collaborative approaches, we contribute to emerging research on inter-organizational cooperation as a critical pathway for achieving system-level sustainability transformation.

The research empirically demonstrates the importance of paradox navigation capabilities for addressing complex sustainability challenges, identifying specific practices that enable organizations to work productively with competing demands rather than forcing false choices. It specifies four integration mechanisms—governance, strategic, operational, and performance integration—that

collectively enable organizations to embed sustainability throughout their systems rather than compartmentalizing it. It illuminates how contextual factors shape sustainability transformation approaches, challenging universal prescriptions and highlighting the importance of contextually-tailored strategies.

These contributions have important implications for advancing sustainable development, particularly SDG 12 (Responsible Consumption and Production) and SDG 17 (Partnerships for the Goals). By identifying specific capabilities and mechanisms that enable substantive sustainability transformations, our research contributes to advancing the UN Sustainable Development Goals. The integration practices we identify directly support SDG 12 by helping organizations embed responsible consumption and production patterns into their core operations. Meanwhile, our findings on power mobilization through coalition building provide insights for implementing SDG 17 by illuminating how organizations can build effective partnerships across sectors to address sustainability challenges.

6.2. Limitations and Future Research

These contributions must be considered in light of several limitations. First, despite our stratified sampling approach, organizations with minimal sustainability commitment remain underrepresented, potentially limiting the generalizability of our findings to early-stage transformation contexts. Future research should explicitly target such organizations to understand their unique transformation pathways. Second, our reliance on cross-sectional data limits causal inferences about transformation processes that unfold over time. Longitudinal studies tracking organizations through different transformation stages would provide stronger evidence for the temporal dynamics we identified. Third, while we triangulated self-reported assessments with qualitative data and objective indicators where available, future studies would benefit from more comprehensive objective measures of transformation outcomes.

While our mixed-methods approach enhances validity through methodological triangulation, the cross-sectional nature of the survey data limits causal inference. Although our qualitative data provides temporal insights, future research using longitudinal designs could more definitively establish causal relationships between capabilities, mechanisms, and transformation outcomes.

Our sample may over-represent organizations already committed to sustainability, potentially limiting generalizability to organizations with minimal sustainability engagement. While we attempted to mitigate this bias through our sampling strategy, future research should specifically target organizations at earlier stages of sustainability awareness to understand capability development from inception.

Our research focused primarily on organizational-level dynamics, with limited attention to individual-level factors (cognitive frames, leadership styles, personal values) and broader system-level factors (industry dynamics, policy environments, cultural contexts). Future research should adopt multi-level approaches that connect individual, organizational, and system levels to develop more comprehensive models of sustainability transformation.

Our measures of transformation outcomes relied primarily on self-reported assessments, which may be subject to social desirability bias. While we triangulated these assessments with qualitative data and documentary evidence in the case studies, future research should incorporate more objective outcome measures to strengthen validity.

Future research should further investigate several promising areas identified in this study. First, research should examine how paradox navigation capabilities develop over time, identifying developmental pathways and potential interventions to accelerate capability development. Second, studies should explore how integration mechanisms interact with different organizational structures, particularly in emerging organizational forms such as platform organizations, distributed networks, and circular business models. Third, research should investigate how power dynamics evolve throughout transformation processes, particularly how sustainability advocates might reshape rather than merely navigate power structures.

Additionally, longitudinal studies examining sustainability transformations as they unfold would provide valuable insights into the temporal dimensions of these processes, including how different capabilities become more or less important at different transformation stages. Research examining more radical transformation approaches could also provide insights into alternative pathways toward regenerative rather than merely sustainable organizational models.

By addressing these limitations and pursuing these promising research directions, future studies can build on the foundation established in this research to develop more comprehensive and nuanced understanding of organizational sustainability transformation.

6.3. Concluding Remarks

This research demonstrates that bridging the gap between sustainability aspirations and substantive action requires organizations to develop specific capabilities while implementing comprehensive integration mechanisms that embed sustainability throughout organizational systems. By navigating paradoxical tensions, integrating sustainability into core processes, addressing power dynamics, and developing robust learning systems, organizations can achieve more substantive sustainability transformations.

However, the research also highlights the contextual nature of these transformation processes, challenging universal prescriptions and emphasizing the importance of tailoring approaches to specific organizational contexts. By recognizing these contextual contingencies while identifying common principles, this research provides both theoretical insights and practical guidance for advancing organizational sustainability transformation.

As organizations continue to grapple with mounting sustainability challenges, the capabilities and mechanisms identified in this research offer pathways for developing more effective responses. By moving beyond symbolic commitments to substantive transformation, organizations can contribute more meaningfully to addressing the complex sustainability challenges facing our world.

Conflicts of Interest: The authors declare no conflicts of interest.

Informed Consent Declarations: All participants provided written informed consent.

Appendix A: Survey Instrument

Survey Instrument: Sustainability Transformation in Organizations

Introduction and Consent

Thank you for participating in this research study on organizational sustainability transformation. This survey examines how organizations navigate the challenges of sustainability transitions, with particular focus on the interplay between institutional conditions and individual agency.

The survey will take approximately 20-25 minutes to complete. Your responses will remain confidential and will be reported only in aggregate form. Participation is voluntary, and you may exit the survey at any time.

By proceeding with this survey, you consent to participate in this research study.

Section 1: Demographic Information

1. Which sector best describes your organization?
 - a. Manufacturing
 - b. Services
 - c. Public Sector
 - d. Non-profit
 - e. Other (please specify): _____
2. What is the size of your organization?

- a. Less than 250 employees
 - b. 250-1,000 employees
 - c. 1,000-10,000 employees
 - d. More than 10,000 employees
3. In which region is your organization headquartered?
- a. North America
 - b. Europe
 - c. Asia
 - d. Latin America
 - e. Africa
 - f. Oceania
4. Which best describes your role in the organization?
- a. C-Suite/Executive
 - b. Sustainability Director/Manager
 - c. Functional Manager
 - d. Sustainability Team Member
 - e. Other (please specify): _____
5. How long have you been involved with sustainability initiatives?
- a. Less than 1 year
 - b. 1-3 years
 - c. 4-7 years
 - d. 8+ years

Section 2: Institutional Conditions

Please indicate your level of agreement with the following statements about the institutional environment in which your organization operates. (1 = Strongly Disagree, 7 = Strongly Agree)

Regulatory Context

1. Sustainability-related regulations in our industry are stringent.
2. Regulatory compliance related to sustainability is strictly enforced.
3. Regulatory requirements for sustainability reporting are comprehensive.
4. Regulatory frameworks provide clear guidance for sustainability practices.
5. Regulations incentivize proactive sustainability action rather than just compliance.

Market Dynamics

1. Our customers actively demand sustainable products/services.
2. Competitors in our industry are advancing sustainability initiatives.
3. Sustainability performance influences our market position.
4. Investors/funders evaluate our organization on sustainability criteria.
5. Our supply chain partners expect sustainability commitments from us.

Cultural Context

1. The societies in which we operate value environmental protection.
2. Social expectations regarding corporate responsibility are high.
3. Sustainability is viewed as a legitimate business concern in our context.
4. There is public pressure for organizations like ours to address sustainability challenges.
5. Industry associations promote sustainability as a standard practice.

Technical Infrastructure

1. Technical solutions for our sustainability challenges are readily available.
2. Our industry has established sustainability metrics and standards.
3. Knowledge resources about sustainability practices are accessible.
4. Collaborative platforms for sustainability exist in our industry.
5. Technology enables sustainability innovation in our sector.

Section 3: Change Agency Practices

Please indicate how frequently the following activities occur within your organization. (1 = Never, 7 = Very Frequently)

Strategic Framing

1. Sustainability issues are framed in terms of business opportunities.
2. Sustainability initiatives are connected to core organizational values.
3. Sustainability challenges are positioned as innovation opportunities.
4. Sustainability is framed differently for different stakeholder groups.
5. Long-term sustainability vision is connected to short-term actions.

Coalition Building

1. Sustainability champions form alliances across departments.
2. Supporters of sustainability initiatives are strategically identified and engaged.
3. Partnerships with external stakeholders advance internal sustainability goals.
4. Cross-functional teams collaborate on sustainability challenges.
5. Senior leadership support for sustainability initiatives is actively cultivated.

Resource Mobilization

1. Sustainability champions secure dedicated resources for initiatives.
2. External funding sources for sustainability projects are identified and accessed.
3. Existing organizational resources are repurposed for sustainability work.
4. Human resources with sustainability expertise are strategically deployed.
5. Success stories are leveraged to gain additional resource commitments.

Political Strategies

1. Sustainability champions navigate power dynamics to advance initiatives.
2. Resistance to sustainability initiatives is anticipated and addressed.
3. Informal influence networks are activated to support sustainability efforts.

4. Windows of opportunity for advancing sustainability are strategically exploited.
5. Potential opponents to sustainability initiatives are converted or neutralized.

Section 4: Paradox Navigation Capabilities

Please indicate your level of agreement with the following statements about how your organization handles tensions in sustainability work. (1 = Strongly Disagree, 7 = Strongly Agree)

Acceptance Practices

1. Our organization acknowledges tensions between competing sustainability objectives.
2. We recognize that sustainability involves inherent contradictions.
3. Competing stakeholder demands regarding sustainability are openly discussed.
4. Trade-offs between short-term and long-term considerations are explicitly addressed.
5. We accept that not all sustainability tensions can be permanently resolved.

Both/And Thinking

1. Our organization seeks solutions that address multiple objectives simultaneously.
2. We reject the notion that economic and environmental goals are inherently opposed.
3. Our approach integrates social and environmental considerations rather than separating them.
4. We view sustainability tensions as potential sources of innovation.
5. Our decision processes accommodate complexity rather than forcing oversimplification.

Creative Synthesis

1. We develop novel approaches that address seemingly contradictory requirements.
2. Our organization creates innovative solutions to sustainability paradoxes.
3. We reconfigure resources to overcome apparent trade-offs.
4. Our sustainability strategies transcend conventional either/or thinking.
5. We transform tensions into opportunities for differentiation.

Structural Support

1. Our organizational structure accommodates competing sustainability demands.
2. We have formal mechanisms for addressing sustainability tensions.
3. Resources are allocated to explore solutions to sustainability paradoxes.
4. Decision processes allow for consideration of multiple sustainability criteria.
5. Leadership encourages constructive engagement with sustainability tensions.

Section 5: Organizational Learning Mechanisms

Please indicate how frequently the following learning activities occur in your organization. (1 = Never, 7 = Very Frequently)

Individual Learning

1. Employees receive training on sustainability-related knowledge and skills.

2. Sustainability considerations are included in professional development plans.
3. External sustainability expertise is brought in to enhance internal capabilities.
4. Employees are encouraged to experiment with sustainability innovations.
5. Individual sustainability learning objectives are established and tracked.

Group Learning

1. Teams reflect on sustainability challenges and experiences.
2. Cross-functional groups share sustainability knowledge and insights.
3. Sustainability communities of practice operate within the organization.
4. Team-level sustainability goals promote collective learning.
5. Groups engage in structured reflection on sustainability initiatives.

Organizational Learning

1. Sustainability experiences are systematically documented and shared.
2. Formal processes exist to review and learn from sustainability initiatives.
3. Sustainability metrics are used to guide organizational learning.
4. Knowledge management systems capture sustainability insights.
5. Learning from sustainability initiatives influences strategic decisions.

Network Learning

1. Our organization participates in sustainability learning networks.
2. We share sustainability knowledge with external stakeholders.
3. Cross-organizational collaborations enhance our sustainability learning.
4. Industry partnerships advance collective sustainability knowledge.
5. We learn from sustainability leaders outside our organization.

Section 6: Integration Practices

Please indicate your level of agreement with the following statements about how sustainability is integrated in your organization. (1 = Strongly Disagree, 7 = Strongly Agree)

Governance Integration

1. Our board has formal responsibility for sustainability oversight.
2. Sustainability considerations are integrated into risk management processes.
3. Executive compensation is linked to sustainability performance.
4. Sustainability governance includes diverse stakeholder perspectives.
5. Formal accountability mechanisms exist for sustainability performance.

Strategic Integration

1. Sustainability is a core element of our organizational strategy.
2. Strategic planning processes incorporate sustainability considerations.
3. Sustainability goals are aligned with overall business objectives.
4. Long-term sustainability vision guides strategic decisions.

5. Resource allocation reflects strategic sustainability priorities.

Operational Integration

1. Sustainability criteria are embedded in operational decision-making.
2. Core business processes incorporate sustainability considerations.
3. Product/service development integrates sustainability requirements.
4. Procurement decisions include sustainability criteria.
5. Everyday operations reflect sustainability commitments.

Performance Integration

1. Sustainability metrics are integrated with other performance indicators.
2. Performance reviews include sustainability-related objectives.
3. Sustainability performance influences career advancement.
4. Reward systems recognize sustainability contributions.
5. Sustainability targets are cascaded throughout the organization.

Section 7: Sustainability Transformation Outcomes

Please indicate your level of agreement with the following statements about sustainability outcomes in your organization. (1 = Strongly Disagree, 7 = Strongly Agree)

Environmental Outcomes

1. Our organization has significantly reduced its environmental footprint.
2. Resource efficiency has improved substantially.
3. Our products/services have reduced environmental impacts.
4. We have innovated to address environmental challenges.
5. Our environmental performance exceeds regulatory requirements.

Social Outcomes

1. Our organization contributes positively to community well-being.
2. We have improved social conditions in our value chain.
3. Diversity, equity, and inclusion have advanced within our organization.
4. Our products/services create social benefits.
5. We actively address human rights considerations.

Economic Outcomes

1. Sustainability initiatives contribute to financial performance.
2. Our sustainability positioning enhances market opportunities.
3. Sustainability-related innovation creates economic value.
4. We have reduced costs through sustainability improvements.
5. Our business model is evolving to be inherently more sustainable.

Transformative Change

1. Sustainability has fundamentally changed how we define success.

2. Our organizational purpose has evolved to incorporate sustainability.
3. Sustainability considerations have transformed decision-making processes.
4. Our organizational culture increasingly embodies sustainability values.
5. Sustainability has become integral to our organizational identity.

Section 8: Open-Ended Questions

1. What do you consider the most significant institutional barriers to sustainability transformation in your organization?
2. What strategies have been most effective in advancing sustainability in your organizational context?
3. How does your organization navigate tensions between different sustainability objectives?
4. What learning approaches have been most valuable for building sustainability capabilities?
5. What advice would you give to others seeking to advance sustainability transformation in similar organizations?

Appendix B: Interview Protocol

Interview Protocol: Sustainability Transformation in Organizations

Thank you for agreeing to participate in this research study on sustainability transformation in organizations. This interview is part of a broader research project examining how organizations navigate the challenges of sustainability transitions, with particular focus on the interplay between institutional conditions and individual agency.

The interview will take approximately 60-90 minutes. With your permission, I would like to record our conversation to ensure accuracy in capturing your insights. Your responses will be kept confidential, and any quotes used in research publications will be anonymized.

Before we begin, do you have any questions about the research or the interview process?

[Obtain verbal consent for participation and recording]

Background Questions

1. Could you briefly describe your role in the organization and how it relates to sustainability initiatives?
2. How long have you been involved with sustainability work, both in this organization and in your career overall?
3. How would you characterize your organization's overall approach to sustainability?
4. What sustainability initiatives or transformations has your organization undertaken in recent years?

Institutional Context

1. How would you describe the institutional environment in which your organization operates regarding sustainability?
 - a. Probe: Regulatory pressures
 - b. Probe: Market expectations

- c. Probe: Stakeholder demands
- d. Probe: Industry norms
- 2. Which external factors have most significantly influenced your organization's sustainability approach?
 - a. Probe: How these influences have changed over time
 - b. Probe: Geographic differences in institutional pressures
- 3. Could you describe specific instances where external conditions have either enabled or constrained your sustainability efforts?
 - a. Probe: How the organization responded to these conditions
 - b. Probe: Strategies for navigating constraints
- 4. How has your organization sought to influence the broader institutional environment regarding sustainability?
 - a. Probe: Involvement in industry associations or standards development
 - b. Probe: Policy advocacy
 - c. Probe: Market education efforts
- 5. What collaborative arrangements with external stakeholders have been important for your sustainability work?
 - a. Probe: Cross-sector partnerships
 - b. Probe: Industry collaborations
 - c. Probe: Challenges and benefits of these collaborations

Change Agency and Leadership

- 1. Who have been the key champions or change agents for sustainability in your organization?
 - a. Probe: Their positions and sources of influence
 - b. Probe: How their approach has evolved over time
- 2. What strategies have sustainability champions used to advance initiatives within the organization?
 - a. Probe: Framing approaches
 - b. Probe: Coalition building
 - c. Probe: Resource mobilization tactics
- 3. Could you describe a specific sustainability initiative and how change agents navigated organizational dynamics to implement it?
 - a. Probe: Barriers encountered
 - b. Probe: Strategies for overcoming resistance
 - c. Probe: Critical success factors
- 4. How do sustainability champions in your organization navigate power dynamics?
 - a. Probe: Relationships with key decision-makers

- b. Probe: Strategies for influencing without formal authority
 - c. Probe: Building legitimacy for sustainability work
5. What have been the most effective leadership approaches for advancing sustainability in your context?
 - a. Probe: Leadership styles
 - b. Probe: Communication strategies
 - c. Probe: Ways of engaging different organizational members

Paradox Navigation and Tensions

1. What significant tensions or competing demands has your organization encountered in sustainability work?
 - a. Probe: Short-term vs. long-term considerations
 - b. Probe: Economic vs. environmental/social objectives
 - c. Probe: Different stakeholder expectations
2. Could you describe a specific situation where your organization faced seemingly contradictory sustainability objectives? How was this handled?
 - a. Probe: Decision-making processes
 - b. Probe: Trade-offs made or avoided
 - c. Probe: Innovative solutions developed
3. How does your organization approach the relationship between financial performance and sustainability objectives?
 - a. Probe: Integration vs. separation
 - b. Probe: How conflicts are resolved
 - c. Probe: Evolution of this relationship over time
4. What organizational structures or processes help your organization navigate sustainability tensions?
 - a. Probe: Governance mechanisms
 - b. Probe: Decision frameworks
 - c. Probe: Dialogue processes
5. How has your organization's approach to sustainability paradoxes evolved over time?
 - a. Probe: Learning from experience
 - b. Probe: Shifts in mindset or approach
 - c. Probe: Increasing comfort with complexity

Learning and Capability Development

1. How does your organization develop sustainability capabilities?
 - a. Probe: Formal training approaches
 - b. Probe: Experiential learning
 - c. Probe: Knowledge sharing mechanisms

2. Could you describe how your organization learns from sustainability initiatives, both successful and unsuccessful ones?
 - a. Probe: Reflection processes
 - b. Probe: Knowledge capture mechanisms
 - c. Probe: Application of lessons learned
3. What mechanisms exist for sharing sustainability knowledge across the organization?
 - a. Probe: Communities of practice
 - b. Probe: Knowledge management systems
 - c. Probe: Cross-functional exchange
4. How does your organization engage with external sources of sustainability knowledge?
 - a. Probe: Industry networks
 - b. Probe: Academic partnerships
 - c. Probe: Stakeholder dialogue
5. What sustainability capabilities have been most important to develop in your context?
 - a. Probe: Technical vs. social capabilities
 - b. Probe: Leadership capabilities
 - c. Probe: Systems thinking capabilities

Integration Practices

1. How is sustainability integrated into your organization's governance structures?
 - a. Probe: Board involvement
 - b. Probe: Executive accountability
 - c. Probe: Formal responsibility structures
2. How does sustainability connect to your organization's strategy and core business?
 - a. Probe: Strategic planning processes
 - b. Probe: Business model considerations
 - c. Probe: Resource allocation
3. Could you describe how sustainability considerations are incorporated into key operational processes?
 - a. Probe: Product/service development
 - b. Probe: Supply chain management
 - c. Probe: Everyday decision-making
4. How does your organization's performance management system address sustainability?
 - a. Probe: Metrics and indicators
 - b. Probe: Target setting
 - c. Probe: Incentive structures
5. What have been the most effective approaches for embedding sustainability throughout your organization rather than isolating it?

- a. Probe: Structural approaches
- b. Probe: Cultural approaches
- c. Probe: Process integration

Transformation Outcomes and Reflection

1. How would you characterize the progress your organization has made in sustainability transformation?
 - a. Probe: Environmental outcomes
 - b. Probe: Social outcomes
 - c. Probe: Business outcomes
2. What do you see as the most significant changes in how your organization approaches sustainability?
 - a. Probe: Mindset shifts
 - b. Probe: Cultural changes
 - c. Probe: Strategic reorientation
3. What have been the most challenging aspects of sustainability transformation in your organization?
 - a. Probe: Persistent barriers
 - b. Probe: Unexpected difficulties
 - c. Probe: Areas of slow progress
4. If you were to advise another organization in your sector on sustainability transformation, what key lessons would you share?
 - a. Probe: Critical success factors
 - b. Probe: Common pitfalls
 - c. Probe: Sequencing of initiatives
5. Looking ahead, what do you see as the next frontier in your organization's sustainability journey?
 - a. Probe: Emerging priorities
 - b. Probe: Capability needs
 - c. Probe: Institutional changes needed

Closing

1. Is there anything else about sustainability transformation in your organization that you think is important for us to understand?
2. Do you have any questions about this research or how your insights will be used?

Thank you very much for your time and insights. Your contribution to this research is invaluable. If you think of anything else you'd like to add after our conversation, please feel free to contact me.

References

1. Hoffman, A.J. The next phase of business sustainability. *Stanford Social Innovation Review* **2018**, *16*, 34–39.
2. Schoenmaker, D.; Schramade, W. (2019). *Principles of sustainable finance*. Oxford University Press.
3. Bromley, P.; Powell, W.W. From smoke and mirrors to walking the talk: Decoupling in the contemporary world. *Academy of Management Annals* **2012**, *6*, 483–530.
4. Milne, M.J.; Gray, R. W(h)ither ecology? The triple bottom line, the global reporting initiative, and corporate sustainability reporting. *Journal of Business Ethics* **2013**, *118*, 13–29.
5. Boiral, O. Corporate greening through ISO 14001: A rational myth? *Organization Science* **2007**, *18*, 127–146.
6. Crilly, D.; Hansen, M.; Zollo, M. The grammar of decoupling: A cognitive-linguistic perspective on firms' sustainability claims and stakeholders' interpretation. *Academy of Management Journal* **2016**, *59*, 705–729.
7. Smith, W.K.; Lewis, M.W. Toward a theory of paradox: A dynamic equilibrium model of organizing. *Academy of Management Review* **2011**, *36*, 381–403.
8. Argyris, C.; Schön, D.A. (1978). *Organizational learning: A theory of action perspective*. Addison-Wesley.
9. Thornton, P.H.; Ocasio, W.; Lounsbury, M. (2012). *The institutional logics perspective: A new approach to culture, structure, and process*. Oxford University Press.
10. Hardy, C.; Maguire, S. (2017). Institutional entrepreneurship and change in fields. In R. Greenwood, C. Oliver, T. Lawrence, & R. Meyer (Eds.), *The SAGE handbook of organizational institutionalism* (pp. 261–280). SAGE Publications.
11. Meadows, D.H. (2008). *Thinking in systems: A primer*. Chelsea Green Publishing.
12. Wang, S.; Zhang, H. Artificial intelligence digital employees and sustainable innovation in online retail: The mediating role of ambidextrous green innovation and the moderating role of ethical anxiety. *Journal of Retailing and Consumer Services* **2025**, *84*, 104235.
13. Hahn, T.; Figge, F.; Pinkse, J.; Preuss, L. A paradox perspective on corporate sustainability: Descriptive, instrumental, and normative aspects. *Journal of Business Ethics* **2018**, *148*, 235–248.
14. Van der Byl, C.A.; Slawinski, N. Embracing tensions in corporate sustainability: A review of research from win-wins and trade-offs to paradoxes and beyond. *Organization & Environment* **2015**, *28*, 54–79.
15. Geissdoerfer, M.; Savaget, P.; Bocken, N.M.; Hultink, E.J. The Circular Economy—A new sustainability paradigm? *Journal of Cleaner Production* **2017**, *143*, 757–768.
16. Slager, R.; Gond, J.P.; Crilly, D. Reactivity to sustainability metrics: A configurational study of motivation and capacity. *Business Ethics Quarterly* **2020**, *30*, 455–485.
17. Levy, D.; Scully, M. The institutional entrepreneur as modern prince: The strategic face of power in contested fields. *Organization Studies* **2007**, *28*, 971–991.
18. Wright, C.; Nyberg, D. An inconvenient truth: How organizations translate climate change into business as usual. *Academy of Management Journal* **2017**, *60*, 1633–1661.
19. United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*. Resolution adopted by the General Assembly.
20. Sharma, G.; Jaiswal, A.K. Unsustainability of sustainability: Cognitive frames and tensions in bottom of the pyramid projects. *Journal of Business Ethics* **2018**, *148*, 291–307.
21. Jay, J. Navigating paradox as a mechanism of change and innovation in hybrid organizations. *Academy of Management Journal* **2013**, *56*, 137–159.
22. Schad, J.; Lewis, M.W.; Raisch, S.; Smith, W.K. Paradox research in management science: Looking back to move forward. *Academy of Management Annals* **2016**, *10*, 5–64.

23. Hahn, T.; Figge, F. Beyond the bounded instrumentality in current corporate sustainability research: Toward an inclusive notion of profitability. *Journal of Business Ethics* **2011**, *104*, 325–345.
24. Aguinis, H.; Glavas, A. Embedded versus peripheral corporate social responsibility: Psychological foundations. *Industrial and Organizational Psychology* **2013**, *6*, 314–332.
25. Gazzola, P.; Amelio, S.; Papagiannis, F.; Michaelides, Z. Sustainability reporting practices and their social impact to NGO funding in Italy. *Critical Perspectives on Accounting* **2021**, *79*, 102085.
26. Calabrese, A.; Costa, R.; Levaldi, N.; Menichini, T. Integrating sustainability into strategic decision-making: A fuzzy AHP method for the selection of relevant sustainability issues. *Technological Forecasting and Social Change* **2018**, *139*, 155–168.
27. Eccles, R.G.; Ioannou, I.; Serafeim, G. The impact of corporate sustainability on organizational processes and performance. *Management Science* **2014**, *60*, 2835–2857.
28. Lozano, R.; Carpenter, A.; Huisingh, D. A review of 'theories of the firm' and their contributions to corporate sustainability. *Journal of Cleaner Production* **2015**, *106*, 430–442.
29. Stubbs, W.; Cocklin, C. Conceptualizing a "sustainability business model". *Organization & Environment* **2008**, *21*, 103–127.
30. Fleming, P.; Spicer, A. Power in management and organization science. *Academy of Management Annals* **2014**, *8*, 237–298.
31. Wang, S.; Zhang, H. (2024b). Inter-organizational cooperation in digital green supply chains: A catalyst for eco-innovations and sustainable business practices. *Journal of Cleaner Production*, *472*, 143383.
32. Wang, S.; Zhang, H. Digital Transformation and Innovation Performance in Small-and Medium-Sized Enterprises: A Systems Perspective on the Interplay of Digital Adoption, Digital Drive, and Digital Culture. *Systems* **2025**, *13*, 43.
33. Siebenhüner, B.; Arnold, M. Organizational learning to manage sustainable development. *Business Strategy and the Environment* **2007**, *16*, 339–353.
34. Preiser, R.; Biggs, R.; De Vos, A.; Folke, C. Social-ecological systems as complex adaptive systems: Organizing principles for advancing research methods and approaches. *Ecology and Society* **2017**, *22*, 32.
35. Argyris, C.; Schön, D.A. (1996). *Organizational learning II: Theory, method, and practice*. Addison-Wesley.
36. Schaefer, A.; Harvey, B. Environmental knowledge and the adoption of ready made environmental management solutions. *Eco-Management and Auditing* **2000**, *7*, 74–81.
37. Fazey, I., Schöpke, N., Caniglia, G., Patterson, J., Hultman, J., van Mierlo, B., Säwe, F., Wiek, A., Wittmayer, J., Aldunce, P., Al Waer, H., Battacharya, N., Bradbury, H., Carmen, E., Colvin, J., Cvitanovic, C., D'Souza, M., Gopel, M., Goldstein, B., ... Wyborn, C. Ten essentials for action-oriented and second order energy transitions, transformations and climate change research. *Energy Research & Social Science* **2018**, *40*, 54–70.
38. Scott, W.R. (2014). *Institutions and organizations: Ideas, interests, and identities*. Sage Publications.
39. Delmas, M.A.; Toffel, M.W. Organizational responses to environmental demands: Opening the black box. *Strategic Management Journal* **2008**, *29*, 1027–1055.
40. Dahlmann, F.; Branicki, L.; Brammer, S. Managing carbon aspirations: The influence of corporate climate change targets on environmental performance. *Journal of Business Ethics* **2017**, *158*, 1–24.
41. Schaltegger, S.; Wagner, M. Sustainable entrepreneurship and sustainability innovation: Categories and interactions. *Business Strategy and the Environment* **2011**, *20*, 222–237.
42. Hoffman, A.J.; Jennings, P.D. Institutional theory and the natural environment: Research in (and on) the Anthropocene. *Organization & Environment* **2015**, *28*, 8–31.

43. Banerjee, S.B.; Arjaliès, D.L. Celebrating the end of enlightenment: Organization theory in the age of the Anthropocene and Gaia (and why neither is the solution to our ecological crisis). *Organization Theory* **2022**, *3*, 1–24.
44. Slawinski, N.; Pinkse, J.; Busch, T.; Banerjee, S.B. The role of paradox theory in decision making and management research. *Organization & Environment* **2021**, *34*, 7–30.
45. Dahlmann, F.; Grosvold, J. Environmental managers and institutional work: Reconciling tensions of competing institutional logics. *Business Ethics Quarterly* **2017**, *27*, 263–291.
46. Greenwood, R.; Raynard, M.; Kodeih, F.; Micelotta, E.R.; Lounsbury, M. Institutional complexity and organizational responses. *Academy of Management Annals* **2011**, *5*, 317–371.
47. Battilana, J.; Dorado, S. Building sustainable hybrid organizations: The case of commercial microfinance organizations. *Academy of Management Journal* **2010**, *53*, 1419–1440.
48. Lounsbury, M.; Wang, M.S. Into the clearing: Back to the future of constitutive institutional analysis. *Organization Theory* **2020**, *1*, 1–27.
49. Bhaskar, R. (1978). *A realist theory of science*. Harvester Press.
50. Banerjee, S.B. Embedding sustainability across the organization: A critical perspective. *Academy of Management Learning & Education* **2011**, *10*, 719–731.
51. Creswell, J.W.; Plano Clark, V.L. (2018). *Designing and conducting mixed methods research* (3rd ed.). SAGE Publications.
52. Teddlie, C.; Tashakkori, A. (2009). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences*. Sage.
53. Eisenhardt, K.M.; Graebner, M.E. Theory building from cases: Opportunities and challenges. *Academy of Management Journal* **2007**, *50*, 25–32.
54. Smith, W.K.; Lewis, M.W.; Jarzabkowski, P.; Langlely, A. (2016). *The Oxford handbook of organizational paradox*. Oxford University Press.
55. Knight, E.; Paroutis, S. Becoming salient: The TMT leader's role in shaping the interpretive context of paradoxical tensions. *Organization Studies* **2017**, *38*(3-4), 403-432.
56. Gond, J.P.; Grubnic, S.; Herzig, C.; Moon, J. Configuring management control systems: Theorizing the integration of strategy and sustainability. *Management Accounting Research* **2012**, *23*, 205–223.
57. Podsakoff, P.M.; MacKenzie, S.B.; Lee, J.Y.; Podsakoff, N.P. Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology* **2003**, *88*, 879–903.
58. Braun, V.; Clarke, V. Using thematic analysis in psychology. *Qualitative Research in Psychology* **2006**, *3*, 77–101.
59. Fetters, M.D.; Curry, L.A.; Creswell, J.W. Achieving integration in mixed methods designs – principles and practices. *Health Services Research* **2013**, *48*(6pt2), 2134-2156.
60. Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.
61. Holland, J.H. (2014). *Complexity: A very short introduction*. Oxford University Press.
62. Avelino, F. Theories of power and social change. Power contestations and their implications for research on social change and innovation. *Journal of Political Power* **2021**, *14*, 425–448.
63. Battilana, J.; Lee, M. Advancing research on hybrid organizing – Insights from the study of social enterprises. *Academy of Management Annals* **2014**, *8*, 397–441.

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.