

Integrating Digital Transformation and Leadership for Business Sustainability: A Systematic Review and Conceptual Framework

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ABSTRACT

Despite massive global investments in the "Twin Transition"—the integration of digital technologies and green initiatives—a profound empirical paradox persists: a majority of digital sustainability efforts fail to deliver their promised outcomes due to a critical neglect of internal human mechanisms. To deconstruct this organizational "black box," this study conducted a Systematic Literature Review (SLR) strictly adhering to the PRISMA 2020 guidelines. We systematically retrieved and analyzed literature from the Scopus database spanning from 2016 to 2025. To ensure the highest standard of empirical validity and article quality, inclusion criteria were rigorously restricted to English-language, peer-reviewed primary journal articles focused explicitly on the digital-sustainability nexus, deliberately excluding non-primary sources such as editorials, conference proceedings, and gray literature. Following a multi-stage screening procedure—encompassing an initial title/abstract thematic evaluation and a subsequent in-depth full-text eligibility assessment—a robust analytical corpus of 102 high-impact articles was established. The synthesis procedure utilized an iterative thematic analysis structurally governed by the Context, Intervention, Mechanism, and Outcome (CIMO) framework to systematically map how technological drivers interact with human variables. This rigorous synthesis uncovers a prevailing theoretical hegemony centered on the Resource-Based View (RBV) and identifies a striking "mixed-methods paradox," highlighting the acute underrepresentation of cultural orchestration in the current literature. To resolve this systemic fragmentation, this research introduces the Sustainability Organizational Culture Framework (SOCF). This integrative conceptual model positions organizational culture as the central mediating mechanism that effectively translates digital interventions and Green Transformational Leadership into holistic Triple Bottom Line performance and long-term organizational resilience. Moving beyond mere techno-solutionism, the SOCF provides a pragmatic, human-centric roadmap for managers and policymakers to align digital investments with cultural readiness, ensuring meaningful institutional survival in the digital age.

Keywords: Business Sustainability, Digital Transformation, Green Transformational Leadership, Organizational Culture, Systematic Literature Review.

1. INTRODUCTION

Over the past decade, business sustainability has fundamentally evolved from a peripheral corporate social responsibility (CSR) concern to a core strategic imperative at the heart of global corporate governance (Ashrafi et al., 2020; Cardillo & Basso, 2025). This paradigm shift is increasingly catalyzed by the pervasive forces of digital transformation, giving rise to the policy-driven "Twin Transition" of green and digital architectures (Singh & Aithal, 2024). However, a profound empirical paradox persists in contemporary corporate reality. While over 91% of enterprises are actively engaged in digital initiatives (Gartner, 2024), recent global analyses reveal that approximately 70% to 80% of digital transformations fail to deliver their promised sustainable value or return on investment (Bellantuono et al., 2021; Chatelier, 2025).

Crucially, empirical evidence reveals that digital transformation failures are predominantly driven by non-technical factors, with 75% of collapses attributed to cultural inertia and misaligned governance while technical deficits account for merely 25%, (Hur et al., 2019), further compounded by 54% of employees feeling unprepared for digital adoption (Abhari, 2025). This misalignment underscores those technological interventions, when deployed in a cultural vacuum, fail to translate into genuine corporate sustainability. Addressing these challenges requires strategic interventions across leadership, culture, and workforce enablement (Marshall, 2025).

Extant systematic literature reviews (SLRs) have made significant strides in mapping this domain, analyzing external institutional pressures (Isensee et al., 2020), direct digital impacts on environmental metrics (Feroz et al., 2021), technology clusters (Guandalini, 2022), and the cultural roots of sustainable outcomes (Assoratgoon & Kantabutra, 2023). Yet, this body of knowledge remains highly fragmented. Current research persists in theoretical silos, focusing on linear correlations between digital tools and performance metrics while largely ignoring the dynamic, reciprocal interactions between external drivers and internal organizational mechanisms. In particular, the internal organizational "black box"—the complex social and operational pathways through which digital strategies are translated into authentic sustainable practices—remains under-theorized (Pricopoaia et al., 2025). While digital investments correlate with green performance (Iqbal et al., 2023), the mediating roles of cultural adaptation, dynamic capabilities, and strategic leadership agency are frequently sidelined, leaving organizations with a severe strategic blind spot.

To address this systemic fragmentation, this study introduces the Sustainability Organizational Culture Framework (SOCF). SOCF is an integrative model that positions organizational culture as the central mediating mechanism that resolves the digital-sustainability dichotomy and illuminates the human-centered pathways of sustainable transformation. Grounded in the Context, Intervention, Mechanism, and Outcome (CIMO) framework, this study addresses four central research questions:

1. **RQ1 (Context & Intervention):** In what sectoral and geographical contexts (C) are digital strategies (I) implemented for business sustainability?
2. **RQ2 (Mechanisms):** What internal mechanisms (M), particularly culture and green innovation, are triggered by these strategies across these contexts (C)?
3. **RQ3 (Outcomes):** What are the reported outcomes (O) of digital strategies (I), and how do they vary across different contexts (C)?
4. **RQ4 (Causal Mediation):** How do specific organizational mechanisms (M) mediate the effectiveness of digital interventions (I) to deliver holistic sustainability outcomes (O)?

Theoretical Review: Integrating the Pillars of the SOCF

Addressing the empirical paradoxes outlined in the introduction requires a departure from traditional, isolated theoretical perspectives. To construct the Sustainability Organizational Culture Framework (SOCF), this study synthesizes three foundational paradigms that have historically operated in silos: the strategic capabilities of technology, the human agency of

leadership, and the internal orchestration of organizational culture (Assoratgoon & Kantabutra, 2023; Feroz et al., 2021).

Bridging Strategic Assets and Cultural Orchestration

The digital transformation of corporate sustainability is fundamentally a capability-building process. From the lens of the Resource-Based View (RBV) and Dynamic Capabilities Theory, digital assets—such as artificial intelligence, blockchain for supply chain transparency, and big data analytics—are viewed as valuable, rare, inimitable, and non-substitutable (VRIN) resources (Barney, 1991; Hong & Xiao, 2024). Because technological landscapes are volatile, organizations must continuously sense green opportunities and purposefully reconfigure their resource base to address environmental challenges (Li et al., 2025; Teece et al., 1997; Zhang & Jin, 2023).

However, while the RBV explains *what* strategic resources are required, it falls short of explaining *how* these digital assets are successfully absorbed into the human fabric of the firm. This is where Organizational Culture Theory acts as the crucial orchestrator (Nneji & Asikhia, 2021; Schein, 2010). A Sustainability Organizational Culture emerges when environmental and social values are no longer external compliance mandates, but deeply embedded collective assumptions manifested through tangible practices like green procurement and circular economy principles (Kharat et al., 2025; Russell & McIntosh, 2011; Zheng et al., 2021). By mapping these dynamics through the Competing Values Framework (CVF), it becomes evident that different cultural archetypes—such as the radical innovation of an *Adhocracy* or the shared inclusivity of a *Clan* culture—determine an organization's capacity to translate technological potential into authentic sustainability rather than superficial greenwashing (Cameron & Quinn, 2011; Soares et al., 2018; Zeb et al., 2021).

Leadership as the Human Catalyst

The fusion of advanced digital tools and adaptive cultural values requires a powerful catalyst: human agency. Transformational Leadership Theory—specifically its evolution into Green Transformational Leadership (GTL)—provides the necessary impetus for this change (Bass, 2015). Green transformational leaders proactively embed environmental visions into the corporate agenda, transcending transactional oversight to inspire and intellectually stimulate their workforce (Elshaer et al., 2024; Karimi et al., 2023). By cultivating psychological safety, these leaders empower employees to experiment with eco-friendly digital solutions, moderating the deployment of technology to ensure it yields genuine environmental and social returns, not merely economic efficiencies (Huang & Huang, 2024).

Overcoming the Silo Problem

The persistent fragmentation of these theories obscures the systemic nature of organizational change. For instance, a robust sustainability culture provides ethical drive and engagement (Casey & Sieber, 2016), yet it cannot optimize performance without the digital infrastructure required to analyze real-time environmental data (Malik, 2024). Conversely, substantial investments in green technology often result in underutilized assets if the culture remains resistant or leadership fails to inspire behavioral shifts. By dissolving these theoretical silos, the SOCF proposes a synergetic system in which technology (the assets), culture (the

orchestration), and leadership (the agency) co-evolve. This integrated approach ensures that digital sustainability interventions address the integrated core of corporate transformation rather than merely its symptoms (Siddaway et al., 2019).

2. METHODS

To ensure a transparent, rigorous, and replicable synthesis of the digital sustainability domain, this study executed a Systematic Literature Review (SLR) strictly anchored in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines (Page et al., 2021). The Scopus database was selected as the primary repository due to its robust indexing standards and extensive coverage of peer-reviewed research across business management and environmental sciences (Falagas et al., 2008).

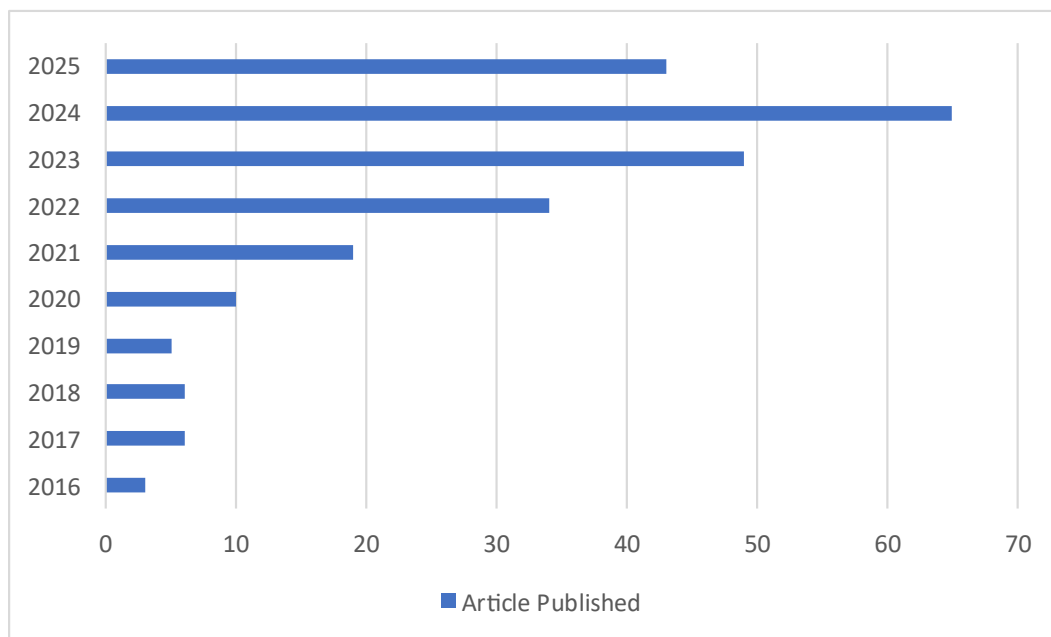


Figure 1. Result from Keyword Search

The literature retrieval phase targeted publications between January 2016 and December 2025, utilizing a highly specific Boolean search string: TITLE-ABS-KEY ((organizational culture OR green organizational culture OR sustainability culture) AND (digital transformation OR digitalization) AND (transformational leadership OR green leadership) AND (sustainability OR corporate sustainability OR business sustainability)). To preserve the highest standard of empirical validity, inclusion was strictly limited to English-language, peer-reviewed primary journal articles, deliberately excluding gray literature, conference proceedings, and editorial commentaries.

The multi-stage selection and screening process was operationalized in accordance with the PRISMA 2020 protocol, moving systematically through four distinct phases: identification, screening, eligibility, and inclusion (see PRISMA Flow in Figure 2). In the initial identification phase, the search query executed across the Scopus database returned a preliminary total of 240 records.

During the subsequent first-stage screening phase, duplicate records and non-journal publication formats were systematically removed, followed by a double-blind thematic screening of titles and abstracts. This evaluation specifically assessed whether candidate articles explicitly integrated human and leadership variables alongside technological frameworks, leading to the exclusion of 138 irrelevant records. Thereafter, during the eligibility assessment phase, the remaining studies underwent a rigorous full-text appraisal, resulting in the exclusion of papers that only mentioned the keywords peripherally without providing substantial empirical or theoretical insights into the organizational "black box." Ultimately, this stringent, multi-tiered screening process yielded a final analytical corpus of 102 high-quality, peer-reviewed articles.

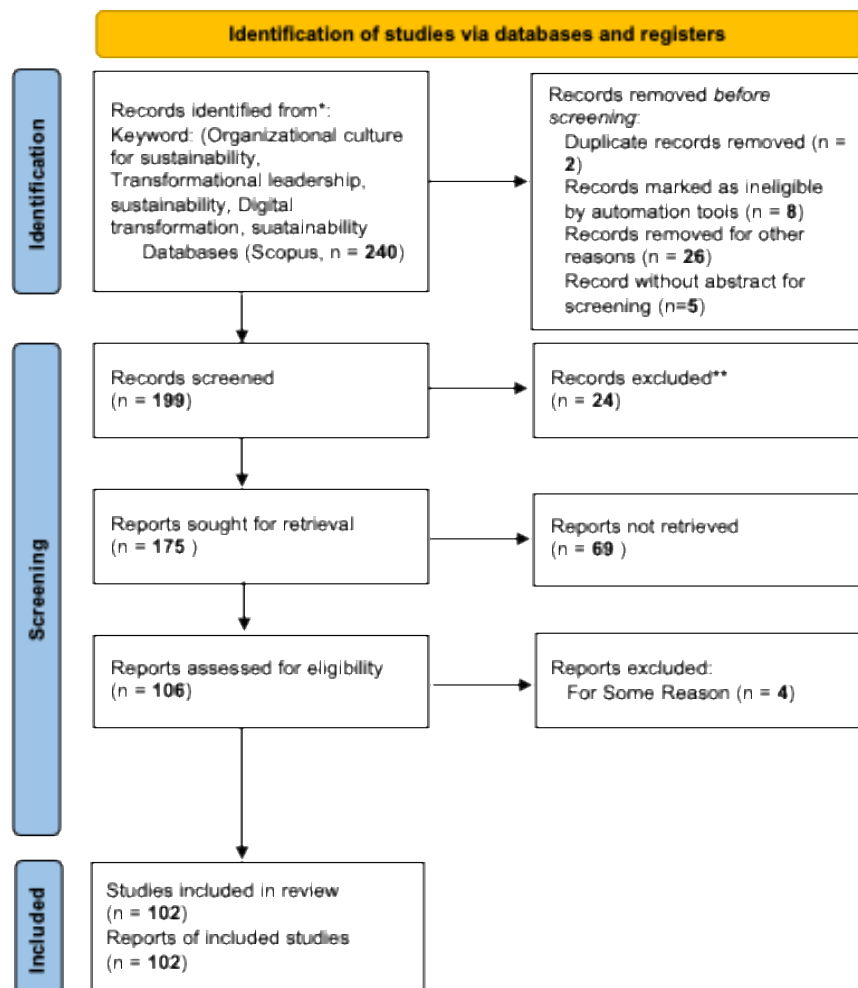


Figure 2. Identification, screening, and inclusion steps

Moving beyond descriptive cataloging, the data extraction phase was structurally governed by the Context, Intervention, Mechanism, and Outcome (CIMO) framework. This strategic choice enabled a systematic deconstruction of how technological drivers (Interventions) interact with embedded human factors (Mechanisms) to generate tangible sustainable value (Outcomes) across diverse geographical and sectoral realities (Contexts). The extracted data

subsequently underwent iterative thematic analysis (Braun & Clarke, 2006) to identify recurring theoretical patterns. By filtering these quantitative and qualitative patterns through the CIMO lens, the synthesis effectively illuminated the human-centered pathways of corporate change, directly scaffolding the conceptual architecture of the Sustainability Organizational Culture Framework (SOCF).

3. RESULTS AND DISCUSSIONS:

Deconstructing the Digital-Sustainability Nexus

The synthesis of the 102 selected articles provides a comprehensive overview of the intersection between digital transformation, organizational culture, and business sustainability. Moving beyond descriptive summaries, this section unpacks the theoretical hegemony, methodological paradoxes, and complex causal mechanisms driving this domain.

Literature Trajectory and Theoretical Hegemony

The dataset reveals a dramatic publication surge between 2022 and 2024, accounting for nearly 60% of the entire corpus (see Table 1). Driven by the post-pandemic digital acceleration and the tightening of global ESG regulations—often framed as the "Twin Transition"—research has decisively pivoted from treating sustainability as a peripheral compliance issue to a core digital strategy (Kudinov, 2025).

Table 1. Annual Publication Distribution of the Final Corpus (2016–2025)

Year Range	Publication Count	Percentage (%)	Key Drivers
2016–2018	12	11.8%	Early CSR-Digitalization Nexus
2019–2021	22	21.6%	Pandemic-driven digital urgency
2022–2024	58	56.8%	ESG regulation & Twin Transition surge
2025	10	9.8%	Advanced AI & circularity integration
Total	102	100%	

However, alongside this growth, a significant theoretical imbalance persists (as mapped in Tables 2 and 3). The Resource-Based View (RBV) and Dynamic Capabilities theory overwhelmingly dominate the landscape (utilized in nearly half the corpus).

Table 2. Classification of Dominant Theoretical Foundations in the Corpus

Rank	Theory	Count	Citations	Core Focus
1	Resource-Based View (RBV)	14	251	Digital & sustainability assets as VRIN resources
2	Dynamic Capabilities Theory	6	216	Sensing, seizing, & reconfiguring capabilities
3	Institutional Theory	3	254	External legitimacy & normative pressures

Rank	Theory	Count	Citations	Core Focus
4	Competing Values Framework (CVF)	3	84	Cultural archetypes (Clan, Adhocracy, etc.)
5	Theory of Planned Behavior (TPB)	2	22	Individual environmental intentions
6	Transformational Leadership Theory	2	20	Visionary motivation & strategic change

This dominance stems from a strategic preoccupation with the *what*—the acquisition of digital assets (AI, IoT, Big Data) as valuable, rare, inimitable, and non-substitutable (VRIN) resources (Barney et al., 2001; Kero & Bogale, 2023). Conversely, human-centric frameworks like the Competing Values Framework (CVF) and Transformational Leadership—which explain the *how*—remain acutely underrepresented.

Table 3. Comparative Analysis of Theoretical Perspectives in Digital Sustainability

Perspective	Dominant Theories	Primary Focus	Role in the Black Box	Identified Limitations
Resource-Centric	RBV, Dynamic Capabilities	Strategic Assets & Technological Tools	The What : Providing technical infrastructure.	Promotes linear logic; overlooks cultural orchestration.
Human-Centric	Transformational Leadership, CVF	Agency, Values, & Cultural Archetypes	The How : Translating tools into sustainable practices	Significantly underrepresented; lacks integrative models.
Institutional	Institutional Theory	External Legitimacy & Pressures	The Why : Driving the adoption of green mandates	Focus on external compliance rather than internal change.

This theoretical hegemony creates a linear, "techno-solutionist" bias, where digital resources are mistakenly expected to automatically yield sustainable outcomes, largely neglecting the cultural orchestration required to embed them (Assoratgoon & Kantabutra, 2023).

The Methodological Paradox

Methodologically, the field is constrained by quantitative dominance (67% of the corpus), heavily prioritizing snapshot surveys and structural equation modeling. While this confirms macro-correlations, it fails to capture the longitudinal, lived realities of organizational change.

Crucially, a striking "Mixed-Methods Paradox" emerges from the data: although mixed-methods research comprises only 4% of the articles, it commands the highest scholarly impact, averaging 43.75 citations per article compared to a mere 5.72 for purely quantitative studies (see Table 4). This stark disparity highlights a profound scholarly hunger for triangulated research. The academic community places a high premium on studies that move beyond

establishing *whether* a digital tool works, to deeply investigating *why* and *how* it succeeds or fails within a specific human context.

Table 4. Summary of Methodological Approaches and Citation Impact

Methodological Category	Article Count	Percentage (%)	Total Citations	Citations per Article
Quantitative Approach	68	67%	389	5.72
Qualitative Approach	28	27%	102	3.64
Mixed Methods Approach	4	4%	175	43.75
Review & Conceptual	2	2%	44	22.00
Total	102	100%	710	6.96

CIMO Thematic Synthesis: Opening the Black Box (RQ1–RQ4)

Applying the CIMO framework systematically answers this study's research questions by decoding the causal chains linking external drivers to internal realities (see Table 5 for the synthesis matrix).

Table 5. CIMO Synthesis Matrix: Linking Drivers, Processes, and Results

CIMO Component	Key Categories Identified	Illustrative Examples & References
Context (C)	Manufacturing (Industry 4.0), SMEs, Emerging Economies, Developed Markets.	German manufacturing (Böttcher et al., 2024) and Asian SMEs (Khan & Terason, 2022).
Intervention (I)	Digital Transformation (AI, IoT, BDA), Green Transformational Leadership.	IoT for energy monitoring (Feroz et al., 2021), Visionary leadership (Elshaer et al., 2024).
Mechanism (M)	Sustainability Culture, Green Innovation, Dynamic Capabilities, Green HRM.	Culture as normative filter (Zheng et al., 2021); GHRM for skill building (Renwick et al., 2013).
Outcome (O)	Triple Bottom Line (TBL), Organizational Resilience, Competitive Advantage.	Carbon footprint reduction (BEYER et al., 2024); Strategic resilience (Weber, 2023).

Context & Intervention (RQ1): Digital interventions are highly context-dependent. High-tech manufacturing sectors tend to leverage advanced infrastructures like Artificial Intelligence (AI) and Internet of Things (IoT) directly for operational carbon reduction. In contrast, Small and Medium-sized Enterprises (SMEs) focus primarily on cloud-readiness and reporting tools driven by external legitimacy pressures (Khan & Terason, 2022). Digital strategies fail when interventions are scaled blindly without adapting to regional and sectoral resource contexts.

Mechanisms (RQ2 & RQ4): The organizational "black box" is fundamentally governed by Sustainability Organizational Culture and Green Innovation. These mechanisms act as normative filters. For instance, deploying Big Data Analytics (Intervention) will only translate into reduced carbon footprints (Outcome) if the workforce shares a cultural assumption that prioritizes ecological integrity over short-term financial optimization (Zheng et al., 2021). Green Transformational Leadership serves as the crucial human catalyst here, cultivating the psychological safety required for employees to experiment with eco-digital innovations (Elshaer et al., 2024).

Outcomes (RQ3): While traditional Triple Bottom Line (TBL) metrics remain standard, recent literature decisively pivots toward *Organizational Resilience*. In a volatile global landscape, digital sustainability is no longer conceptualized merely as ethical stewardship; it is recognized as a fundamental strategic capability that allows organizations to anticipate, absorb, and adapt to systemic shocks (Weber, 2023).

Synthesis and the Sustainability Organizational Culture Framework (SOCF)

The preceding thematic analysis underscores a research landscape characterized by isolated excellence, where studies on technology, leadership, and culture exist in parallel but disconnected streams. To resolve this systemic fragmentation, this study proposes the Sustainability Organizational Culture Framework (SOCF)—an integrative model designed to demystify the causal orchestration of digital sustainability. By positioning organizational culture as the central mediating mechanism, the SOCF offers a holistic roadmap clarifying how external technological interventions and leadership agency translate into institutional resilience.

The ideological bedrock of the SOCF lies in the internalization of Environmental, Social, and Governance (ESG) principles into an organization's normative assumptions. Unlike superficial compliance mandates, genuine sustainability occurs when these values become the social infrastructure of the firm (Lozano, 2015; Schein, 2010). Within this framework, digital enablers (e.g., AI, IoT) act as powerful accelerators, providing the technical capacity (*the what*) to monitor and optimize resources (George et al., 2021). However, the SOCF posits that technology remains inert without Green Transformational Leadership (*the who*), which serves as the strategic orchestrator. Visionary leaders catalyze cultural change by cultivating psychological safety and inspiring a workforce to experiment with eco-friendly practices (Elshaer et al., 2024; Karimi et al., 2023). Ultimately, this alignment filters through a receptive organizational culture (*the how*), shifting the ultimate goal of corporate sustainability from static, compliance-based performance to a dynamic capability: Organizational Resilience (Weber, 2023).

Table 6. Core Components and Causal Logic of the SOCF

Component	Strategic Role	Causal Logic in the Framework
External Drivers	Digital Transformation & Green Leadership	Act as catalysts that trigger organizational change and provide the

		necessary vision and tools (George et al., 2021; Sacavém et al., 2025).
Central Mediator	Sustainability Organizational Culture	Functions as a normative filter and social infrastructure that translates drivers into actions (Cameron & Quinn, 2011).
Moderating Factors	Regulatory Pressures & Market Dynamics	Contextual variables can strengthen or weaken the relationship between culture and outcomes (Horak et al., 2018).
Strategic Outcomes	TBL Performance & Organizational Resilience	Multifaceted results of successful technology-culture-leadership alignment (Elkington & Rowlands, 1999; Weber, 2023).

Practical Implications: Orchestrating the Human-Digital Nexus

The development of the SOCF transcends theoretical inquiry, offering a strategic roadmap for stakeholders navigating the complexities of the twin transition.

- a. **For Managers and Organizational Leaders:** The primary imperative is to move beyond techno-centric implementation. Substantial investments in digital green technologies will falter if unaccompanied by proportional investments in human capital (Isensee et al., 2020). Before deploying sophisticated systems such as AI-driven predictive maintenance or IoT energy analytics in a manufacturing setting (Hong & Xiao, 2024; Malik, 2024), leaders must conduct cultural readiness audits using diagnostic tools like the Competing Values Framework (CVF) (Cameron & Quinn, 2011). For instance, in a manufacturing plant dominated by a *Hierarchy* culture (focused on operational control and risk aversion), management should frame IoT energy monitoring as a tool to enforce safety and compliance standards rather than automated surveillance, thereby alleviating shop-floor skepticism. Conversely, in a *Market*-oriented plant, leaders can link real-time IoT emissions data directly to team key performance indicators (KPIs) and green financial bonuses. For *Clan* cultures, AI tools are best introduced as collaborative assistants that simplify workflow and support team-based eco-goals, whereas an *Adhocracy* environment thrives on rapid, experimental pilots of smart sensor technologies (Soares et al., 2018). Furthermore, executive development must evolve toward the Green Transformational model, empowering managers to foster psychological safety and reward eco-digital innovation, thereby reducing resistance to digital disruption (Elshaer et al., 2024; Huang & Huang, 2024).
- b. **For Policymakers and Industrial Bodies:** Fostering a sustainable digital economy requires strategies that extend beyond traditional financial incentives for hardware. Subsidies and grants should be deliberately coupled with human capital and leadership development initiatives. Particularly for Small and Medium-sized Enterprises (SMEs) facing resource constraints (Costa Melo et al., 2023), policymakers should facilitate inter-firm consortiums where leading organizations share cultural integration strategies and best practices with smaller entities in their supply chain (Ismail, 2025).

4. CONCLUSIONS

This systematic literature review addresses a critical paradox in contemporary business strategy: while digital transformation holds immense potential for driving sustainability, its frequent failure rate stems from a profound neglect of the internal, human-centric "black box." By synthesizing 102 pivotal studies through the CIMO framework, this research dismantles prevailing theoretical silos and introduces the Sustainability Organizational Culture Framework (SOCF). This model firmly establishes that digital tools are merely inert resources until they are activated by visionary green leadership and embedded within a receptive, sustainability-driven organizational culture.

While this study utilized a rigorous PRISMA-compliant protocol, it is constrained by its reliance on the Scopus database and English-language publications, which may inadvertently overlook culturally nuanced insights from non-English academic spheres.

To advance this paradigm, future research must transition from conceptualization to rigorous empirical validation. We propose three vital trajectories: First, large-scale survey validation of the SOCF is required to quantify how specific cultural archetypes mediate digital investments across diverse sectors (El-Kassar & Singh, 2019). Second, the academic community must critically investigate the "dark side" of digitalization—addressing the ecological footprint of e-waste, energy consumption of AI, and socio-economic disruptions—to prevent blind techno-solutionism and ensure an equitable transition (Kunkel & Matthess, 2020). Finally, there is an urgent methodological mandate for longitudinal, mixed-methods research to authentically capture the lived, processual journey of cultural change (Plano Clark, 2017), particularly within traditional industries in emerging economies striving for meaningful survival in the digital age.

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