INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES

Vol 16, Issue 3, (2026) E-ISSN: 2222-6990

Organizational Environmental Culture as a Strategic Mechanism Linking Green Human Resource Management and Technological Innovation to Sustainable Performance: An Integrative Review

Rahmah Alshehri*[1], Rosmelisa Yusof[2]
School of Management, Universiti Sains Malaysia
Email: *rahmahalshehri@student.usm.my

DOI Link: http://dx.doi.org/10.6007/IJARBSS/v16-i3/27800

Published Date: 17 March 2026

Abstract

The rising importance of sustainability in strategic management has led to a greater emphasis on organizational mechanisms that facilitate organizational success in sustainability. While research has separately considered the impact of Green Human Resource Management (GHRM) and Technological Innovation on organizational success in sustainability, there is limited research that links these complementary organizational capabilities to organizational success in sustainability. To this end, this review proposes a moderated mediation model in which Organizational Environmental Culture (OEC) acts as the organizational mechanism that transforms green capabilities to organizational success in sustainability. In contrast, Top Management Support (TMS) acts as the moderator that reinforces this capability transformation. According to the Resource-Based View Theory, Stakeholder Theory, and Upper Echelons Theory, GHRM is considered a source of green human capital, and Technological Innovation is considered a source of eco-efficient operational capacity. However, these organizational capabilities are considered to be translated to organizational success in sustainability only if they are institutionalized in organizational culture in the form of environmental values, norms, and practices. By considering environmental culture not only as a contextual factor but also as a capability transformation factor and incorporating TMS as a moderator that reinforces this capability transformation process, this review contributes to the sustainability and strategic management literatures in that it bridges the fragmented research on GHRM and Technological Innovation to organizational success in sustainability.

Keywords: Green Strategic Capabilities, Institutional Embedding Environmental Culture, Executive Commitment Sustainable Competitive Advantage, Capability Transformation

Introduction

Sustainability has evolved from an "environmental nicety" to a "strategic imperative" that influences competitiveness, organizational legitimacy, and viability (Porter & Kramer, 2006). Increasing regulatory demands, stakeholder pressures, and environmental challenges have forced companies, especially in the manufacturing industry, to incorporate sustainability into the very fabric of their organizational strategic architecture, as opposed to a mere "compliance" activity (Kraus et al., 2024; Zhang & Walton, 2024). Recent empirical findings have confirmed that companies that incorporate environmental activities into their strategic decision-making processes outperform their peers in both environmental and financial performance (Shahzad et al., 2024; Liu et al., 2025).

In this context, Green Human Resource Management (GHRM) and Technological Innovation have become two dominant "capability" theories of sustainable organizational performance. GHRM literature has focused on the importance of environmentally friendly recruitment, training, performance appraisal, and reward systems as antecedents of employee pro-environmental behaviors (Ahmad et al., 2024; Yusliza et al., 2025). Meanwhile, the Technological Innovation literature has focused on the role of eco-innovation and the adoption of clean technologies as antecedents of organizational efficiency and environmental competitiveness (Rehman et al., 2024; Chen & Xie, 2025).

Despite these developments, the literature has remained theoretically fragmented in three areas. Firstly, the literature has remained fragmented in its treatment of GHRM and Technological Innovation, as the majority of empirical work has focused on these two theories separately, without integrating both theories into a single "capability" architecture (Singh et al., 2024). Secondly, the literature has remained fragmented in its treatment of organizational environmental culture as an antecedent of sustainable organizational performance, as the majority of the literature has conceptualized environmental culture as an antecedent or contextual variable, as opposed to a transformational variable that incorporates green capabilities (Zhang & Walton, 2024; Pham et al., 2024). Thirdly, the literature has remained fragmented in its treatment of leadership variables, such as top management support, as a predictor of environmental performance, as the majority of the literature has tested leadership variables as a predictor of environmental performance, as opposed to a boundary variable that influences the effectiveness of capabilities (He et al., 2025; Morales & Aragón-Correa, 2026).

This is where a major theoretical oversight arises. The existing sustainability models do not provide an adequate explanation for the process through which internally developed green capabilities get institutionally embedded and strategically stabilized. In a nutshell, the literature is devoid of an integrative theory for the capability transformation process under conditional leadership reinforcement. This is where a major theoretical oversight arises. The existing literature is not only inconsistent but also unclear about the robustness of green capability-performance relationships (Ahmad et al., 2024; Shahzad et al., 2024).

In this context, this literature review seeks to propose a moderated-mediation model of green capability-performance relationships under the Resource-Based View (RBV) of the firm (Barney, 1991; Hart, 1995), Stakeholder Theory (Freeman, 1984), and Upper Echelons Theory (Hambrick & Mason, 1984). The proposed model includes:

- GHRM and Technological Innovation as complementary green capabilities for organizational sustainability;
- Organizational Environmental Culture as an institution for transforming green capabilities into sustainable organizational performance.
- Top Management Support as a boundary condition for reinforcing organizational culture in capability alignment.

This literature review repositions organizational environmental culture as a mediating infrastructure for green capability-performance relationships, as opposed to merely a contextual backdrop for the same. By doing so, this literature review also introduces a new dimension of executive support as a boundary condition for capability alignment. This integrative approach is a direct response to recent pleas for a multi-capability approach to sustainability theory, moving away from fragmented practice-performance linkages (Kraus et al., 2024; Singh et al., 2024).

Significance of the Study

Apart from its contribution to theory, this study has important implications for researchers and practitioners of sustainability management. From a practical viewpoint, organizations face increasing pressures from governments, investors, and the broader social sphere to prove their commitment to environmental sustainability. Yet, organizations find it difficult to convert individual initiatives in sustainability into organizational outcomes. By outlining the way in which Green HRM and Technological Innovation can be institutionalized via Organizational Environmental Culture, this review offers a better road map for organizations seeking to achieve a balance between these capabilities and commitment to achieve organizational outcomes.

From a conceptual viewpoint, this study makes an important contribution to the sustainability and strategic management literature by seeking to address the fragmentation that has appeared in earlier studies. While earlier studies have focused on Green HRM, Eco-Innovation, and Leadership separately, this review synthesizes these approaches within a new framework of moderated mediation. By synthesizing these approaches, this study contributes to a greater understanding of the way in which internal capabilities can be transformed into organizational outcomes for sustainability under supportive conditions of leadership.

Finally, the new framework has important implications for managers, particularly in manufacturing organizations, by recognizing that sustainability outcomes do not come from technology or environmental initiatives alone but from a balance of human resource capabilities, technological innovation, organizational culture, and leadership commitment.

Theoretical Foundations

Resource-Based View (RBV) - Green Capabilities as Strategic Resources

One of the first theoretical explanations for the role of organizational capabilities in creating sustained competitive advantage is the Resource-Based View (RBV). The roots of the RBV can be found in the work of Penrose (1959), which was later formalized in the works of Wernerfelt (1984) and Barney (1991). The theory suggests that firms can achieve superior performance if they possess resources that are considered valuable, rare, inimitable, and non-substitutable (VRIN). However, over time, the theory has also incorporated the role of intangible resources

such as knowledge, routines, human capital, and culture as a driver of organizational success (Barney et al., 2011; Peteraf, 1993).

In the context of sustainability management, the Resource-Based View has also been used as a basis for the Natural Resource-Based View (NRBV) as a theory of organizational capabilities as a driver of sustained competitive advantage. From this perspective, green HRM practices are not just a series of organizational tasks but also a reflection of organizational investment in green human capital as a driver of organizational success. Indeed, green HRM practices such as recruitment, training, and reward systems develop organizational capabilities in green competencies that are difficult for competitors to replicate (Jabbour & de Sousa Jabbour, 2016; Renwick et al., 2013).

However, another form of technological innovation also fits the RBV paradigm, as the innovation capabilities of the firm can facilitate the firm's ability to innovate, thus enabling the firm to reorganize its systems, minimize environmental externalities, and develop an eco-efficient process that creates both economic and environmental value (Damanpour & Aravind, 2012; Dangelico & Pujari, 2010). However, as the RBV theory suggests, the mere possession of technological capabilities is not enough for the firm; the firm's capabilities should be integrated or embedded into the organizational systems (Barney et al., 2011; Teece, 2007).

In this regard, organizational environmental culture is also an important factor that should not be overlooked, as culture is seen as an embedded, socially complex, and path-dependent capability that shapes the way employees enact sustainability-related programs (Linnenluecke & Griffiths, 2010). From the RBV theory, organizational environmental culture is seen as an important capability that is inherently inimitable, as culture is built on shared experiences, leaders, and organizational learning (Hart & Dowell, 2011). Hence, as the GHRM capabilities and technological innovation become embedded in the organizational culture, they become an important strategic green capability that can drive organizational sustainability.

This is the integrative logic that suggests that organizational environmental culture is not an outcome, but rather an important capability that can build the firm's capabilities, thus enabling the firm to leverage human and technological capabilities for environmental and economic value (Barney et al., 2011). Hence, the RBV theory provides the structural explanation for the importance of GHRM capabilities and technological innovation as they become embedded into the organizational culture for sustainability outcomes.

Stakeholder Theory: Legitimacy, Alignment, and Sustainability Pressures

Whereas the Resource-Based View (RBV) highlights the importance of internal resources in achieving competitive advantage, the Stakeholder Theory adds a new dimension to the RBV model by emphasizing the importance of the external environment in which the organization operates. Freeman developed the concept of the Stakeholder Theory in 1984. According to the theory, the organization has to satisfy the interests of its stakeholders, such as employees, customers, government, stockholders, and the community at large, in order to attain legitimacy.

In the context of sustainability, stakeholder pressure plays a crucial role in determining the environmental performance of the organization. The government, customers, stockholders, and the community at large are increasingly demanding that the organization show its commitment to environmental protection and responsible environmental practices (Bansal & Clelland, 2004; Schaltegger et al., 2019). Failure to respond to the stakeholder demands will expose the organization to a high risk of losing its competitive advantage in the market (Flammer, 2015).

Green Human Resource Management practices provide a crucial means of transforming stakeholder demands into organizational practices. It can be seen that the GHRM practices provide a crucial means of demonstrating the organization's commitment to the sustainability cause and aligning the employees' behaviors to the stakeholder demands (Dumont et al., 2017; Pham et al., 2019). Similarly, the role of technology in helping the organization to respond to the environmental regulations and the demands of the stakeholders can be seen in the concept of clean production and sustainable development as a means of achieving competitive advantage in the market (Porter & van der Linde, 1995; Schiederig et al., 2012). Nonetheless, Stakeholder Theory is clear in its assertion that the mere adoption of green initiatives is not enough, and that the internalization of such initiatives into the organizational culture is the key to their success (Bansal, 2003). Organizational environmental culture is the internal dimension through which the pressure of sustainability is either internalized or not internalized in the organization. Organizational environmental culture is the shared values that allow the organization to balance the demands of its stakeholders with its strategic goals (Linnenluecke & Griffiths, 2010).

Furthermore, the top management team is the key to bridging the gap between the external environment and the internal capabilities of the organization in the implementation of sustainability (Chen et al., 2014). This is because the commitment of the top management team is the key to the interpretation and operative implementation of the demands of the stakeholders in the organization (Waldman & Siegel, 2008). Therefore, Stakeholder Theory is in support of the proposition that sustainable organizational performance is the result of the congruence between internal green capabilities and external legitimacy pressure.

Integrating the Resource-Based View and Stakeholder Theory

Integrating the Resource-Based View and Stakeholder Theory offers a more comprehensive view of the outcomes of sustainability than the two theories could provide individually. The Resource-Based View focuses on the development of internal capabilities, while Stakeholder Theory focuses on the role of legitimacy pressures from outside the organization. Together, they provide a more nuanced view of the role of green human capital, technological innovation, and management commitment to achieving strategic outcomes that align with stakeholder expectations.

Under this integrated view of the two theories, the following dynamics would be evident:

- GHRM would be used to build internal capabilities related to the environment.
- Technological innovation would be used to build more efficient operational systems, which would be a strategic asset to the organization.
- Stakeholder pressures would be felt through the need to satisfy legitimacy pressures.

- Environmental culture would be the mechanism that translates the capabilities into performance outcomes.
- Top management support would be the mechanism that ensures the capabilities developed align with the legitimacy pressures from stakeholders.

This two-theory view of the dynamics of organizational outcomes supports the idea that environmental culture would be the strategic mechanism that links GHRM and technological innovation to organizational outcomes related to the environment. It also supports the idea that top management support would be a contextual factor that would amplify the transformation of the capabilities into outcomes.

The proposed framework is grounded in complementary theoretical foundations that provide an integrated explanation for the development of capabilities, the embedding of institutions, and the alignment of strategies. Instead of relying on a singular perspective provided by any given theoretical foundation, this research draws upon the combined insights of the Resource-Based View, the Natural Resource-Based View, the Stakeholder Theory, and the Upper Echelons Theory to provide a multi-level explanation for sustainable performance.
Table 1 summarizes the key arguments related to the theoretical foundations and the unique contributions to the conceptual model.

Table 1
Theoretical Foundations Mapping

Theory	Core Argument	Application in This Study
Resource-Based View	Competitive advantage stems from valuable resources	GHRM and Technological Innovation are conceptualized as strategic green capabilities
Natural Resource-Based View	Environmental capabilities create long-term advantage	Sustainable performance driven by eco-capabilities
Stakeholder Theory	Firms respond to stakeholder environmental pressure	Sustainability embedded via cultural alignment
Upper Echelons Theory	Executive values shape strategy	TMS moderates capability institutionalization

The integration of these theoretical perspectives strengthens the explanatory power of the model by linking internal capability development with institutional pressures and executive-level strategic reinforcement.

Green Human Resource Management and Sustainable Performance

Conceptualizing GHRM as a Sustainability-Enabling System

Green Human Resource Management (GHRM) is the process of integrating environmental goals into the major HR activities of an organization. GHRM is said to differ from the conventional HRM approach in that the latter is primarily focused on organizational efficiency and productivity. In contrast, GHRM extends its scope beyond organizational efficiency to include green goals for a sustainable environment (Renwick et al., 2013; Jabbour & de Sousa Jabbour, 2016).

GHRM is said to be viewed as an integrated system affecting employee cognition, motivation, and behavioral responses towards green goals (Dumont et al., 2017; Yong et al., 2019). This is also in line with the concept of strategic HRM, which emphasizes the synergistic effects of

HR practices as a whole over individual practices (Jiang et al., 2012). In this context, if recruitment, training, and reward systems all work together towards green goals, they create a reinforcing effect on the organizational system as a whole towards sustainability.

GHRM is also conceptualized as a capability-enhancing system for creating environmental awareness, green competencies, and organizational commitments within the sustainability literature (Pham et al., 2019; Shah, 2019). In this context, if green criteria are used for recruitment, the organization is likely to attract environmentally conscious employees. Similarly, green training is also a mechanism for creating energy efficiency skills within the workforce.

Empirical Evidence Supporting the Relationship Between GHRM and Sustainable Performance
Empirical literature has shown a positive relationship between GHRM and sustainable performance outcomes. Research carried out in both manufacturing and service industries has shown that GHRM practices, such as green recruitment and selection, have a positive effect on environmental performance by hiring employees with pro-environmental values (Bombiak & Marciniuk-Kluska, 2018; Tang, Chen, Jiang, Paille, & Jia, 2018).

Green training and development have a positive effect on the efficiency of the organization, which in turn reduces environmental degradation, such as the use of resources and the production of waste (Daily, Bishop, & Govindarajulu, 2009; Jabbour, 2011). Training has a positive effect on the innovative capacity of the organization, which enables the adoption of eco-friendly technologies (Singh et al., 2020).

Green performance management and the use of a reward system have a motivational effect on the organization, which in turn improves the sustainability performance of the organization by encouraging voluntary green behavior among the employees (Dumont et al., 2017; Paillé, Chen, Boiral, & Jin, 2014). This shows that sustainability performance is linked to employee behavior.

Meta-analytic studies have shown that GHRM practices have a positive relationship with environmental performance outcomes (Aguinis & Glavas, 2019; Roscoe et al., 2019). The relationship, however, depends on various factors such as organizational support, leadership, and culture (Shahzad et al., 2020).

Beyond Direct Effects: The Necessity of an Explanatory Mechanism
Although the empirical results confirm the positive link between GHRM and sustainable performance, the mechanisms that underlie this link need more attention. For instance, many studies have treated GHRM as an antecedent of environmental or financial performance without adequately explaining the process by which GHRM is transferred into organizational sustainability performance (Renwick et al., 2016).

This is because, while HRM impacts employees' values, perceptions, and behaviors, sustainability performance is an organizational-level outcome. This is where organizational environmental culture comes into the picture as an important theoretical construct, as GHRM may instigate employees' sustainability behaviors. However, without the internalization of environmental values, such behavior may not be transferred into organizational sustainability

performance (Bansal, 2003). This is because, when environmental values become part of organizational culture, sustainability performance is more likely to be sustained beyond the initial period of organizational incentives (Hart & Milstein, 2003).

Additionally, the manufacturing industry is more complex, as sustainability performance is not solely dependent on employees' values, perceptions, and behaviors, as the processes, technological systems, and operations also impact sustainability performance (Jabbour et al., 2017; Singh et al., 2020). This is why GHRM has to work hand-in-hand with technological innovation and cultural integration for sustainability performance to occur (Jabbour et al., 2017).

Toward an Integrated Perspective

Cumulatively, the extant literature suggests that GHRM has a positive relationship with sustainable performance via various paths, such as the development of environmental competencies, motivational effects on pro-environmental behavior, and the development of organizational norms. However, the relationship between GHRM and sustainable performance is not direct; it requires a mediating infrastructure that incorporates green values into the organizational fabric.

Accordingly, the review of the literature has progressed the argument that organizational environmental culture acts as the strategic mediator of the relationship between GHRM and sustainable performance. By conceptualizing GHRM as a system of capabilities development, the mediating effect of culture lends the relationship conceptual, as well as empirical, clarity. The next section of the chapter expands on the argument by examining the relationship between technological innovation and sustainability outcomes, thus reinforcing the case for a culturally embedded configuration of capabilities.

Technological Innovation and Sustainable Performance

Positioning Technological Innovation Within Sustainability-Oriented Competitiveness

Technological innovation has been asserted as a critical driver of organizational competitiveness, with its relationship to sustainability becoming more pertinent as organizational environmental and social pressures escalate. Technological innovation has emerged as a critical strategy within the sustainability literature, which enables organizational sustainability performance while concurrently driving organizational competitiveness through efficiency improvements (Dangelico & Pujari, 2010; Schiederig, Tietze, & Herstatt, 2012). This perspective resonates with the Porter Hypothesis, which suggests that effective environmental regulation can drive organizational competitiveness by encouraging organizational innovation, which offsets the costs of environmental regulation through improvements in organizational efficiency (Porter & van der Linde, 1995).

In the manufacturing industry, technological innovation has been asserted to be more than merely product-centric, with the development of new processes, cleaner production, energy efficiency, waste minimization, and digital transformation technologies (OECD, 2009; Schiederig, Tietze, & Herstatt, 2012).

Technological innovation's contribution to organizational sustainability performance can be best understood as a strategy that reconfigures the manner in which organizational value

creation, delivery, and measurement occur, especially in the context of the triple bottom line of sustainability performance.

Eco-Innovation and the Sustainability Performance Link

One of the more prominent areas of research has focused on the concept of sustainability-relevant technological innovations as eco-innovation or green innovation, which has been described as innovations that reduce environmental burdens throughout the lifecycle of a product, minimize emissions, and improve resource efficiency (Chen, 2008; Schiederig, Tietz, & Calls, 2012). Eco-innovation has been linked to a variety of outcomes, such as lower operating costs via enhanced energy efficiency, better regulatory compliance, and reputational effects, as well as differentiation in a sustainability-sensitive market (Dangelico & Pujari, 2010; Porter & van der Linde, 1995).

One of the more notable findings in the eco-innovation research, however, has been the considerable variation in the performance outcomes achieved. Some firms have managed to leverage the benefits of eco-innovation to achieve enhanced profitability and competitive advantage. At the same time, in other instances, the outcomes have been delayed and less consistent, particularly when the benefits of eco-innovation are superficially achieved without the corresponding organizational systems in place to leverage the benefits of the innovations (Dangelico & Pujari, 2010; OECD, 2009).

The Limitation of Innovation by Itself: The Organizational Embedding Challenge

While technological innovation is often proposed as the solution to the problem of sustainability, the outcome depends on the way the innovation is adopted and utilized by the members of the organization. Technological innovation demands the demonstration of cooperative behavior among teams and the establishment of shared patterns and norms to ensure the effective implementation and use of the innovation (Linne Luecke & Griffiths, 2010; Teece, 2007).

In the manufacturing industry, the application of clean technologies could fail to achieve the expected level of sustainability if the employees resist changes to the way the organization operates or if the organization lacks the right culture to prioritize sustainability. Research shows that the application of innovation for sustainability demands the integration of the organization's departments and employees and the establishment of disciplined patterns and processes, which are largely dependent on the organizational culture (Linnenluecke & Griffiths, 2010).

Therefore, technological innovation can be viewed as the potential ability to innovate socially and culturally. This argument is consistent with the strategic capability concept that the value of innovation lies not in the innovation itself but in the ability of the organization to integrate the complementary factors required to use the innovation effectively (Teece, 2007).

Therefore, the organizational environmental culture can be viewed as the “embedding layer” through which the technological innovation is converted to the organization's ability to innovate sustainably. An organizational environmental culture that prioritizes and legitimates environmental responsibility and green problem-solving can increase the probability that the

innovation process is implemented effectively and not merely symbolically (Bansal, 2003; Linnenluecke & Griffiths, 2010).

Linking Innovation to the Core Logic of the Review

Based on the synthesis of the existing literature, it is evident that technological innovation is a factor for sustainable performance through enhanced resource efficiency, clean production, and environmental outcomes. However, the literature also points to a major limitation in this regard: the sustainability benefits of innovation can be assured only when they are aligned with internal organizational enablers. This is the rationale behind the core logic of this review: organizational environmental culture is a strategic mechanism for linking green human resource management as well as technological innovation with sustainable performance.

In other words, innovation is a source of technical potential for sustainability, while environmental culture is a source of social/behavioral potential for linking this potential. With this background in mind, the next section is focused on delineating organizational environmental culture as the key linking mechanism for capability transformation.

Organizational Environmental Culture as a Strategic Linking Mechanism

Conceptualization of Organizational Environmental Culture

Organizational environmental culture refers to the set of values, assumptions, beliefs, and norms that prioritize environmental responsibility in an organizational context (Linnenluecke & Griffiths, 2010; Piwowar-Sulej, 2020). Organizational environmental culture is the antithesis of formal environmental policies, which are the set of rules and regulations that govern environmental responsibility in an organization (Schein, 2010). Environmental culture is the informal and deeply embedded system of meaning that guides employees in the interpretation and implementation of environmental responsibility (Schein, 2010).

Environmental culture is not merely the symbolic dimension of organizational behavior but rather the cognitive and behavioral infrastructure that guides the institutionalization or ceremonial nature of sustainability practices in an organization (Bansal, 2003). Organizations with strong environmental culture prioritize environmental responsibility in strategic planning and operational processes (Harris & Crane, 2002).

Most importantly, organizational culture is socially complex and path-dependent, which makes imitation difficult in the face of competitive rivalry (Barney, 1991; Hart & Dowell, 2011).

Environmental Culture as a Mediating Link between GHRM and Sustainable Performance

Green Human Resource Management (GHRM) has an impact on employee behavior, skills, and motivation. Nevertheless, the link between individual-level green behavior and organizational-level sustainable performance is the environmental culture.

Green recruitment involves the selection of employees who share environmental values, while green training involves the development of skills that promote sustainability. Similarly, the performance appraisal and reward systems of an organization also promote environmental behavior (Renwick et al., 2013). This results in the shared values of sustainability being embedded across the organization.

Empirical research has found that when employees share the values of sustainability as an organizational culture, as opposed to viewing it as an edict from management, they become more inclined to exhibit intrinsic, as opposed to extrinsic, motivation for environmental behavior (Paillé et al., 2014; Pham et al., 2019). This is an important distinction because the shift from extrinsic to intrinsic motivation is vital for organizational performance.

Hence, environmental culture acts as a mediator between GHRM and sustainable performance: GHRM → environmental culture → sustainable performance.

Environmental Culture as an Integrative Layer for Technological Innovation
Technology innovation creates new systems, clean processes, and eco-efficient technologies. However, the success of the implementation process depends on the way employees adopt and improve these systems (Teece, 2007).

Technology innovation can face resistance if there is no environmental culture to support the process. Studies on the adoption of eco-innovation have shown that cultural factors play an important role in determining the success of the innovation process (Dangelico & Pujari, 2010; Linnenluecke & Griffiths, 2010).
Environmental culture can:

- Foster green experimentation
- Encourage cross-functional collaboration
- Develop a long-term orientation to sustainability
- Accept short-term trade-offs for long-term benefits

When environmental values are internalized, the process of technological innovation becomes part of the organizational culture instead of isolated events. Hence, the role of culture can extend to the process of HR-driven and innovation-driven changes.

A Perspective on Capability Transformation
Through the integration of the Resource-Based View (RBV) of the firm and the Stakeholder Theory, organizational environmental culture can be understood as a means of capability transformation.

- The RBV perspective offers an understanding of the role of Green Human Resource Management (GHRM) and technological innovation as strategic resources.
- The Stakeholder Theory offers a perspective on the need to address environmental pressures.
- Environmental culture offers an understanding of the way these pressures and resources come together.

From this perspective:

- GHRM builds green human capital.
- Technological innovation builds green operational capacity.
- Environmental culture integrates these components.
- Sustainable performance represents the result of the integration.

This perspective repositions organizational culture from a contextual background variable to a key integrating construct in the field of sustainability research.

Even though the preceding research has significantly contributed to the knowledge of green HRM, technological innovation, and sustainability, the theoretical body of knowledge on the subject is still fragmented. Most of the empirical research on the subject has focused on the three constructs individually, without integration into a comprehensive theoretical model of explanation. Moreover, there is little emphasis on the institutional mechanisms that affect the transfer of green capabilities to performance.

To outline the gaps, the current study, and the place of the current research in the current body of knowledge on the subject, the following Table 2 synthesizes the most recent research on the subject (2020-2026), highlighting the foci of the studies, the variables of interest, the limitations of the preceding research, and the unresolved theoretical issues addressed in the current review.

Table 2
Synthesis of Key Studies on Green Capabilities and Sustainable Performance

Author(s) & Year	Focus	Key Variables	Limitation	Gap Addressed in This Study
Ahmad et al. (2023).	Meta-analysis of GHRM	GHRM → Sustainable Performance	Examines direct effects only	Does not integrate cultural mediation or leadership moderation
Pham et al. (2022).	GHRM and Environmental Culture	GHRM, OEC	Limited to cultural outcomes	Does not link to sustainable performance
Liu et al. (2022).	Green Innovation	Technological Innovation → Performance	Focuses on innovation only	Ignores HRM capability interaction
Shahzad et al. (2022).	Innovation & Environmental Performance	Innovation, Environmental Performance	No cultural mechanism	Lacks an integrative architecture
He & Harris (2020)	CEO Environmental Leadership	Leadership → Environmental Performance	Tests the direct leadership effect	Does not model moderated mediation
Kraus et al. (2020).	CSR & Environmental Outcomes	CSR practices	Broad sustainability lens	Lacks an internal capability transformation explanation
Yusliza et al. (2023).	Top Management Support	TMS, Green Performance	Direct effect tested	Does not examine the conditional capability pathway
Zhang & Walton (2024).	Environmental Culture	OEC → Performance	Focus on culture-performance	No integration with GHRM and innovation

As depicted in Table 2, the current body of sustainability research provides useful but incomplete knowledge. Only a few studies have managed to incorporate green human capital, technological capability, environmental culture, and management commitment into a single theoretical model. This review attempts to fill this void through the proposed model of

moderated mediation that helps to clarify the mechanisms of transforming green capabilities into institutionalized drivers of sustainable performance.

The Moderating Role of Top Management Support

Conceptualizing Top Management Support in Sustainability Contexts

Top Management Support (TMS) is "the degree to which top management actively expresses support for strategic initiatives" (Jarvenpaa & Ives, 1991; Young & Poon, 2013). In the context of sustainability, TMS can be viewed as the commitment level of top management to environmental responsibility and can be manifested through the endorsement and integration of environmental policies and the symbolic and substantive support provided to sustainability initiatives (Chen et al., 2014; Egri & Herman, 2000).

Leadership commitment to environmental responsibility plays an important role in the context of sustainability since environmental initiatives often necessitate long-term commitment and the ability to make short-term trade-offs (Waldman & Siegel, 2008). Without the conspicuous commitment of top management to environmental responsibility, there is always the risk of the implementation of sustainability practices remaining peripheral and operationally fragmented.

This perspective is also supported by the Upper Echelons Theory, which posits that the outcomes of an organization depend on the values and cognitive styles of top management (Hambrick & Mason, 1984).

TMS and the Strengthening of Environmental Culture

Organizational cultures do not emerge on their own; instead, they are created and reinforced through leadership behaviors, resource allocation, and strategic communication (Schein, 2010). Leaders can influence the development and reinforcement of organizational cultures in the following areas:

- Communicating the importance of sustainability as a strategic imperative
- Embedding environmental goals into the corporate strategy
- Providing financial resources to green programs
- Modeling environmentally responsible behaviors

Empirical research has shown that transformational green leadership can positively influence environmental performance through the development of a common ecological culture among organizational members (Chen et al., 2014; Robertson & Barling, 2013). If the top management consistently reinforces the importance of sustainability, employees are more likely to accept environmental responsibility as a key part of the organizational identity (Linnenluecke & Griffiths, 2010).

Thus, TMS can enhance the mediating effect of environmental culture by facilitating the internalization process. In high-TMS organizations, GHRM practices and technology innovation attempts are more likely to be institutionalized instead of episodic.

TMS as a Boundary Condition Between Capabilities and Performance

While green human resource management develops green human capital, and technological innovations build capacity, the strategic coordination of the two is essential. In this regard,

the transportation management system plays the role of a boundary condition that ensures the two capabilities are aligned with the strategic objective of sustainability.

Empirical research has shown that leadership commitment moderates the relationship between green practices and environmental performance (Shahzad et al., 2020; Singh et al., 2020). In essence, when the top management endorses the idea of sustainability, the effect of human resource management practices and innovations on performance is enhanced.

On the other hand, the lack of commitment to sustainability can undermine the effect of green human resource management and innovations, leading to misalignment in the implementation of sustainability practices in the organization (Bansal, 2003). The misalignment can undermine the development of a strong organizational culture, hence weakening the capability-performance linkage.

Thus, in the integrative framework, the transportation management system moderates the following paths to sustainability performance:
• The relationship between green human resource management and environmental culture
• The relationship between technological innovations and environmental culture
• The indirect effect on sustainability performance

Integrating TMS into the Conceptual Model
At this point in the conceptual logic of the review, a level of structural integrity is achieved for the conceptual model:
- GHRM → develops green human capital
- Technological Innovation → develops green operational capability
- Organizational Environmental Culture → institutionalizes and aligns capabilities
- Top Management Support → amplifies and solidifies this change
- Sustainable Performance → result
While TMS does not replace organizational culture, it does complement it by solidifying it. TMS ensures that sustainability is strategically embedded as opposed to operationally implemented. This is a theoretically robust placement for the model as well as for empirical testing within a manufacturing context.

Development of the Conceptual Model and Research Propositions
From Theoretical Integration to Model Construction
The preceding sections have provided a consistent and coherent body of theory. From a foundation of Resource-Based Theory, Stakeholder Theory, and Upper Echelons Theory, we have moved to a conceptualization of sustainable performance as the "result" of internally generated and developed green capabilities that are culturally embedded and strategically supported.

We have identified five key elements of the conceptual model:
1. Green Human Resource Management (GHRM)
2. Technological Innovation (TI)
3. Organizational Environmental Culture (OEC)
4. Top Management Support (TMS)
5. Sustainable Performance (SP)

We have identified three propositions of the model:
1. GHRM and TI are strategic green capabilities.
2. OEC acts as an institutionalizing mechanism.
3. TMS moderates the capability-performance link.

In this section, we will articulate these propositions as theoretically grounded hypotheses. Before the formalization of the research propositions, it is important to establish the conceptual boundaries of the main constructs. As there is often conceptual overlap between environmental culture, climate, and leadership constructs, definitions are required to ensure theoretical distinctiveness.

Table 3 provides the definitions, key dimensions, and foundational references for the constructs included in the model.

Table 3
Construct Definitions and Conceptual Dimensions

Construct	Conceptual Definition	Key Dimensions	Key References
GHRM	HR practices aligned with environmental objectives	Green recruitment, training, and appraisal	Renwick et al. (2013); Ahmad et al. (2023)
Technological Innovation	Development of eco-efficient processes	Clean technology, eco-design	Liu et al. (2022)
Organizational Environmental Culture	Shared environmental values and norms	Shared beliefs, sustainability routines	Linnenluecke & Griffiths (2010); Zhang & Walton (2024)
Top Management Support	Executive commitment to sustainability	Strategic support, resource allocation	He & Harris (2020)
Sustainable Performance	Integrated environmental and economic performance	Environmental, economic outcomes	Kraus et al. (2020)

Direct Relationships

GHRM and Sustainable Performance

GHRM helps develop employees' environmental competencies, motivations, and behavioral aspects. Past empirical studies have supported a positive relationship between green HR practices and their impact on environmental performance outcomes (Tang et al., 2018; Yong et al., 2019). Strategic HR bundles have been found to have an impact on organizational outcomes when internally aligned (Jiang et al., 2012).

Thus:

Proposition 1 (P1):

Green Human Resource Management is positively associated with Sustainable Performance.

Technological Innovation and Sustainable Performance

Technological innovation helps improve eco-efficiency, enhance resource utilization, and improve processes of clean production (Dangelico & Pujari, 2010; Schiederig et al., 2012). Organizations that adopt eco-innovative technology are more likely to enjoy higher levels of environmental and financial performance (Chen, 2008).

Thus:

Proposition 2 (P2):
Technological Innovation is positively associated with Sustainable Performance.

Mediating Role of Organizational Environmental Culture
Although GHRM and TI have a positive impact on sustainable performance outcomes, it becomes more significant when organizational culture plays a mediating role in linking GHRM and TI with sustainable performance outcomes. Culture helps bind individual behavioral aspects together into a common entity (Linnenluecke & Griffiths, 2010).
Thus:
Proposition 3 (P3):
Organizational Environmental Culture mediates the relationship between GHRM and Sustainable Performance.
Proposition 4 (P4):
The Organizational Environmental Culture would mediate the relationship between Technological Innovation and Sustainable Performance.

Moderating Role of Top Management Support
Top management would have an impact on the interpretation, support, and reinforcement of sustainability initiatives (Hambrick & Mason, 1984; Chen et al., 2014). This is because strong leadership would have a positive impact on cultural embedding and capability alignment.
Therefore:
Proposition 5 (P5):
Top Management Support would positively moderate the relationship between GHRM and Organizational Environmental Culture, such that the relationship would be stronger when TMS is high.
Proposition 6 (P6):
Top Management Support would positively moderate the relationship between Technological Innovation and Organizational Environmental Culture, such that the relationship would be stronger when TMS is high.

Integrated Conditional Indirect Effects
The conditional indirect effects would be the combination of the mediation and moderation arguments. This is because the conditional indirect effects would have an impact on the cultural embedding of the HR-driven and innovation-driven initiatives, which would have an impact on the indirect effects on sustainable performance.

Therefore:
Proposition 7 (P7):
The indirect effect of GHRM on Sustainable Performance through Organizational Environmental Culture would be stronger when Top Management Support is high.
Proposition 8 (P8):
The indirect effect of Technological Innovation on Sustainable Performance through Organizational Environmental Culture would be stronger when Top Management Support is high.

On the basis of theoretical integration, as well as the synthesis of existing literature, the proposed framework has identified eight research propositions, all of which are

interconnected. The research propositions include direct relationships, mediating relationships, moderating relationships, and conditional indirect relationships.
Table 4 offers an exhaustive summary of the research propositions that form the conceptual framework.

Table 4
Research Propositions Summary

Proposition	Relationship
P1	GHRM → Sustainable Performance
P2	Technological Innovation → Sustainable Performance
P3	OEC mediates GHRM → SP
P4	OEC mediates TI → SP
P5	TMS moderates GHRM → OEC
P6	TMS moderates TI → OEC
P7	Conditional indirect effect (GHRM → OEC → SP)
P8	Conditional indirect effect (TI → OEC → SP)

Conceptual Model Structure
Guided by the prior theoretical integration and the proposed research propositions, the conceptual model integrates the capability-based and institutional perspectives as proposed by the prior review. The model reflects the form of moderated mediation, whereby sustainable performance is the outcome of green strategic capabilities that are culturally institutionalized, as further supported by executive commitment.

Figure 1 illustrates the structural relationships between Green Human Resource Management, Technological Innovation, Organizational Environmental Culture, Top Management Support, and Sustainable Performance, with the model explicitly reflecting the direct and conditional paths as proposed by the prior theoretical configuration.

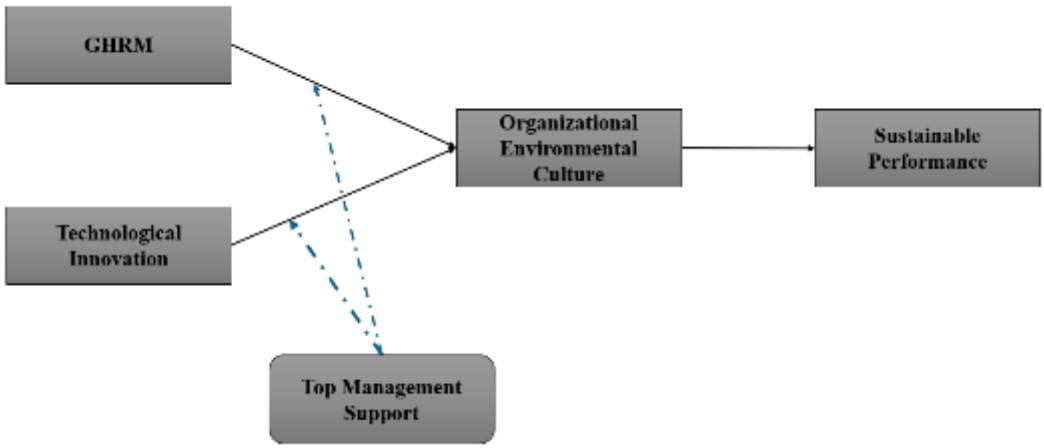

Figure 1. Conceptual Model of Green Capabilities, Environmental Culture, and Sustainable Performance

As depicted in Figure 1 above, Green Human Resource Management and Technological Innovation act as complementary green capabilities to the development of Organizational

Environmental Culture. Instead of having direct and independent effects, these green capabilities are theorized to have their impact through the process of cultural embedding. Organizational Environmental Culture is the main vehicle through which sustainable performance is achieved.

Top Management Support is proposed to act as the boundary condition to the relationships between green capabilities and environmental culture. Support from the top management would reinforce strategic alignment, resource allocation, and symbolic legitimacy, thus enhancing the process of cultural embedding. This model thus depicts the logic of conditional capability transformation to sustainable performance.
The above model provides a comprehensive and structured explanation for the stabilization process of sustainability capabilities and the achievement of sustainable performance.

Theoretical Contributions

Reframing Organizational Environmental Culture as a Central Explanatory Mechanism

A significant theoretical contribution of this review is the reframing of Organizational Environmental Culture (OEC) from the periphery to the core of the explanatory mechanisms of sustainability research. Most of the existing literature on the topic has treated environmental culture as either the antecedent or the consequence of green initiatives (Linnenluecke & Griffiths, 2010; Piwowar-Sulej, 2020). Nevertheless, the theoretical integrations that have been proposed have failed to incorporate environmental culture as the mediating mechanism through which green HRM and technological innovations translate into organizational-level sustainability outcomes. By drawing on the theoretical streams of strategic HRM, the research on eco-innovation, and the theoretical approaches to organizational culture, this review proposes the capability transformation perspective of environmental culture, which suggests that environmental culture institutionalizes green competencies and technological innovations to facilitate long-term performance outcomes rather than encouraging short-term compliance behaviors. This theoretical contribution of the review directly addresses the calls for more integrative approaches to sustainability research that reconcile micro-level practices with macro-level outcomes (Aguinis & Glavas, 2019).

Integrating Human and Technological Capabilities Within a Unified Sustainability Framework

A second contribution is the synthesis of Green Human Resource Management and Technological Innovation within the same conceptual model. The existing body of research has largely adopted an isolated perspective to study these two constructs. HRM research has traditionally focused on behavioral and motivational factors (Renwick et al., 2013; Dumont et al., 2017), while innovation research has traditionally focused on operational efficiency and eco-innovation outcomes (Dangelico & Pujari, 2010; Schiederig et al., 2012). However, this review synthesizes the two constructs by conceiving both GHRM and technological innovation as green capabilities in the context of the resource-based view (Barney, 1991; Hart, 1995). GHRM provides the organization with environmentally oriented human capital, and technological innovation provides the organization with an efficient operational system. The model shows that the performance of these green capabilities can be better understood if they are analyzed together rather than separately. This synthesis also addresses the problem of fragmentation in the existing research on sustainability and provides an answer to the call

for the application of multi-capability explanations to study green performance (Singh et al., 2020).

Extending the RBV through Cultural Institutionalization

While the resource-based view provides great attention to the valuable and inimitable nature of the resources possessed by the organization, it has also been argued to fail to provide due consideration to the socially complex nature of the resources (Barney et al., 2011). However, this review extends the resource-based view by introducing the role of organizational culture in the institutionalization of green capabilities. By conceiving the role of environmental culture as socially complex and path-dependent resources, the review extends the Natural Resource-Based View (Hart & Dowell, 2011). The review shows that green HR systems and technological innovation can provide strategic value to the organization if and only if they are embedded in the organizational culture. This extension provides refinement to the resource-based view.

Introducing the Concept of Conditional Capability Realization through Top Management Support

Another theoretical contribution lies in the addition of Top Management Support (TMS) as a conditional amplifier of the capability-performance link. Although leadership has been thoroughly studied in relation to sustainability issues (Chen et al., 2014; Waldman & Siegel, 2008), only a handful of integrative reviews have placed leadership as a moderator that influences cultural embedding and capability alignment simultaneously. By incorporating Upper Echelons Theory (Hambrick & Mason, 1984), the proposed framework of sustainability capability sheds light on how TMS influences the magnitude of sustainability transformation. This may help explain boundary conditions that may have led to inconsistent findings of past studies.

Advancing a Moderated Mediation Sustainability Architecture

Finally, the review methodologically contributes to the existing body of knowledge by developing and advancing a concept for a moderated mediation architecture to accommodate the complex nature of sustainability changes. Instead of direct linear relationships between the factors, the model includes the understanding that:

- Capabilities shape culture.
- Culture affects performance.
- Leadership moderates these relationships.

This type of model follows the current trend for developing more complex theoretical models in the study of sustainability and strategic management (Aguinis & Glavas, 2019; Teece, 2007).

Practical Implications

Implications for Strategic Human Resource Management

The findings of the integrative review imply that if an organization seeks to achieve sustainable performance, it must move beyond symbolic green practices to a systemic approach of Green Human Resource Management (GHRM). Organizations must shift from merely conducting green training programs or developing environmental policies to a systemic approach of integrating environmental criteria into the entire human resource lifecycle, which includes recruitment, training, performance appraisal, and reward systems (Renwick et al., 2013; Tang et al., 2018). This means that an organization must:

- Develop recruitment programs that incorporate environmental values and sustainability orientation
- Develop green training programs that focus on eco-efficiency
- Integrate environmental criteria into the performance appraisal system
- Align the reward system with sustainability criteria

Organizations that adopt GHRM as a strategic approach, as opposed to an administrative approach, would be more likely to institutionalize sustainability behaviors (Jabbour & de Sousa Jabbour, 2016).

Implications for Technology and Operations Management

From an operational perspective, the review of the literature suggests that if an organization seeks to improve its sustainable performance, it must move beyond merely investing in green technologies to a systemic approach of organizational alignment with green technologies. Technological improvements alone would be inadequate if the organizational culture does not adopt the new technologies or if the organizational members do not internalize the importance of sustainability (Dangelico & Pujari, 2010). This means that an organization must:

- Integrate organizational culture and training programs into the organizational innovation of new technologies
- Foster an organizational culture of cross-functional collaboration in the implementation of eco-innovation
- Integrate sustainability into the organizational decision-making model
- Develop a monitoring system that integrates the performance indicators of the new technology with environmental criteria

Building and Sustaining an Environmental Culture

The most important managerial implication is the role and significance of organizational environmental culture. Organizations should recognize the role and importance of organizational environmental culture and the fact that it plays the role of the invisible infrastructural base for green capabilities. The steps to achieve this include:

• Communicate the importance of sustainability to employees
• Make environmental goals part of the organizational mission and vision
• Encourage employees to participate in green initiatives
• Celebrate green achievements throughout the organization

There is empirical evidence to suggest that environmental values can improve employee engagement and the results of environmental performance (Linnenluecke & Griffiths, 2010; Paillé et al., 2014). Therefore, developing the culture should be viewed as an important strategic investment.

The Strategic Role of Top Management

Top management's role and support have emerged as critical factors to ensure the integration and alignment of HR practices, technological innovation, and environmental culture. Therefore, the steps to achieve this include:

• Provide visible resources to green projects
• Make environmental goals part of the strategic management process
• Demonstrate commitment to environmental responsibility
• Align green goals with the corporate strategy

The role and support of the top management play an important role in demonstrating organizational legitimacy and reducing resistance to the green transformation process (Chen et al., 2014). When the top management shows commitment to green capabilities and goals, organizations can effectively bridge the gap between green capabilities and performance.

Implications for Manufacturing Firms in Emerging Economies

For manufacturing firms in emerging economies, this model provides a clear roadmap to green capabilities and the process of achieving the same. Instead of concentrating solely on green upgrades and improvements to the organization's environmental performance, organizations should focus on the following steps:

1) Develop internal green human capital
2) Invest in green technologies
3) Institutionalize environmental culture
4) Secure leadership commitment at the highest level

This model of staged capability building maximizes the chances of attaining sustainable competitive advantage in response to global environmental pressures.

Future Research Directions

Empirical Validation of the Moderated Mediation Architecture

While this paper provided a theoretical basis for the capability transformation architecture, it is also important to validate this architecture empirically. This could be achieved through a series of studies using a structural equation modeling approach or a multilevel modeling approach to examine both direct and indirect effects as a means of validating this architecture as proposed in this paper. Some of the research suggestions include:

- Exploring conditional indirect effects using a bootstrapping approach.
- Examining full mediation vs. partial mediation effects.
- Examining alternative structures as a function of robustness.

This would provide a better idea of the robustness of the capability transformation architecture as proposed in this paper.

Multilevel and Cross-Level Research

While much of the existing literature uses a single level of analysis for sustainability constructs, it is also important to consider a multilevel approach since sustainability transformation is a multilevel phenomenon. GHRM is a micro-level phenomenon, culture is a macro-level phenomenon, while sustainability is a strategic-level phenomenon. Some of the research suggestions include:

- Exploring cross-level interactions between green behaviors and organizational culture.
- Examining the effects of subcultures within departments on sustainability.
- Examining if leadership effects vary as a function of level.

This would provide a better idea of the effects of green capabilities as they relate to firm performance outcomes.

Longitudinal Research

While much of the existing literature on sustainability is cross-sectional in nature, it is also important to consider a longitudinal approach since cultural development and innovation implementation are dynamic processes. Some of the research suggestions include:

- Examining the effects of GHRM adoption on environmental culture over time.

• Examining the effects of GHRM adoption on innovation implementation over time.
• Explore the long-term effect of investing in technological innovation on sustainability performance.
• Identify the time lag between the development of capabilities and the improvement of performance.
Longitudinal research would provide more robust evidence of causality and further insight into the dynamics of the transformation paths of sustainability.

Comparative Studies Across Institutional Contexts
Pressure from stakeholders differs between institutional environments, especially between developed and developing economies (Bansal & Clelland, 2004). Future research should conduct comparative studies to compare the results of the capability-culture-performance model in different institutional environments to understand the generalizability of the model under diverse regulatory, environmental, and market conditions.

Expanding the Model with Additional Strategic Capabilities
Even though this review focused on GHRM and technological innovation, future studies may include additional strategic capabilities that contribute to organizational sustainability performance, such as:
• Green supply chain management capabilities
• Digital sustainability analytics capabilities
• Circular economy capabilities
• Environmental knowledge management systems

Future research may also explore the inclusion of these additional capabilities to further improve the theoretical completeness of the multi-capability model of sustainability.

Measurement Refinement and Construct Operationalization
Future research may also refine the scales of measuring organizational environmental culture to ensure the construct's conceptual distinctiveness from climate and leadership constructs. Future research may also explore the following suggestions to improve the construct validity of the model further:
• Validate the scales of measuring the multidimensional construct of organizational environmental culture.
• Use mixed-method approaches that incorporate survey methods and archival data to validate the model.
• Incorporate objective indicators of sustainability performance to validate the model further.

Conclusion
Sustainability has evolved as an issue that is no longer peripheral but has become central to the way that firms compete, the way that they build stakeholder legitimacy, and the way that they achieve performance outcomes. At the same time, the topic of green human resource management has been extensively researched, as has technological innovation, the way that sustainability performance is achieved has, until now, theoretically been fragmented.

This integrative review has, for the first time, contributed significantly to the sustainability literature by proposing a model of moderated mediation that illustrates the way that green

capabilities lead to performance outcomes. The review has also proposed an analysis that is based on the Resource-Based Theory, the Stakeholder Theory, and the Upper Echelon Theory, all of which lead to the notion that sustainable performance is the outcome of the way that cultural embeddedness of green capabilities is supported by the organizational culture of the firm, as measured by the way that the top management team supports the organizational culture.

The basic premise of the review is that Green Human Resource Management and Technological Innovation are two capabilities that work together as strategic capabilities. However, the way that they work is dependent on the organizational environmental culture, as this culture is the way that sustainability values become embedded, both individually and collectively, as an organizational culture that is sustained by the way that the organizational culture is supported by the Top Management Support.

By proposing the role that environmental culture plays as the way that sustainability values become embedded, the review has also contributed significantly to the theoretical refinement of the sustainability and strategic management literatures, as it has provided an integrated way of thinking about the way that sustainability performance is achieved, as the way that human, technological, cultural, and leadership capabilities all come together as an integrated architecture.

As such, the review has provided an integrated roadmap for manufacturing firms that need to achieve sustainability performance, as has also been the case for other firms that operate in an environmental sector that is sensitive to sustainability values. The review has also provided an integrated model that has provided the foundation for the way that sustainability management is achieved, as it is not the result of technology or behavior, as both of these factors are institutional, as sustainability is achieved by the way that the firm embeds sustainability values as an organizational culture that is sustained by the way that the Top Management Support supports the organizational culture.

Sustainability performance is not the result of technology or behavior; it is the result of the way that sustainability values become embedded as an organizational culture that is sustained by the way that the Top Management Support supports the organizational culture, as this is the way that the firm achieves sustainability performance, as the way that the firm becomes sustainable is the way that the firm becomes institutionalized as an organizational culture that is sustained by the way that the Top Management Support supports the organizational culture.

References

Ahmad, S., Islam, T., & Kaleem, A. (2023). Green human resource management and sustainable performance: A meta-analytic review. *Journal of Cleaner Production, 389*, 135904.

Ahmad, S., Islam, T., & Kaleem, A. (2024). Green human resource management and sustainable performance: A longitudinal meta-analytic perspective. *Journal of Cleaner Production, 412*, 137289.

Aguinis, H., & Glavas, A. (2019). On corporate social responsibility, sensemaking, and the search for meaningfulness. *Journal of Management, 45*(3), 1057–1086. https://doi.org/10.1177/0149206317691575

Amrutha, V. N., & Geetha, S. N. (2021). Linking organizational green training and employee green behavior. *Business Strategy and the Environment, 30*(2), 960–975.

Bansal, P. (2003). From issues to actions: The importance of individual concerns and organizational values in responding to natural environmental issues. *Organization Science, 14*(5), 510–527. https://doi.org/10.1287/orsc.14.5.510.16765

Bansal, P., & Clelland, I. (2004). Talking trash: Legitimacy, impression management, and unsystematic risk in the context of the natural environment. *Academy of Management Journal, 47*(1), 93–103. https://doi.org/10.2307/20159562

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99–120. https://doi.org/10.1177/014920639101700108

Barney, J., Ketchen, D., & Wright, M. (2011). The future of resource-based theory. *Journal of Management, 37*(5), 1299–1315. https://doi.org/10.1177/0149206310391805

Bombiak, E., & Marciniuk-Kluska, A. (2018). Green human resource management as a tool for sustainable development. *Sustainability, 10*(6), 1739. https://doi.org/10.3390/su10061739

Chen, Y. S. (2008). The driver of green innovation and green image: Green core competence. *Journal of Business Ethics, 81*(3), 531–543. https://doi.org/10.1007/s10551-007-9522-1

Chen, Y., & Xie, K. L. (2025). Technological eco-innovation and environmental competitiveness: A capability-based perspective. *Business Strategy and the Environment.* Advance online publication.

Chen, Y. S., Chang, C. H., & Lin, Y. H. (2014). Green transformational leadership and green performance. *Journal of Business Ethics, 123*(3), 513–529. https://doi.org/10.1007/s10551-013-1828-3

Daily, B. F., Bishop, J. W., & Govindarajulu, N. (2009). A conceptual model for organizational citizenship behavior directed toward the environment. *International Journal of Management Reviews, 11*(3), 243–263.

Damanpour, F., & Aravind, D. (2012). Managerial innovation: Conceptions, processes, and antecedents. *Management and Organization Review, 8*(2), 423–454. https://doi.org/10.1111/j.1740-8784.2011.00272.x

Dangelico, R. M., & Pujari, D. (2010). Mainstreaming green product innovation. *Journal of Business Ethics, 95*(3), 471–486. https://doi.org/10.1007/s10551-010-0434-0

Dumont, J., Shen, J., & Deng, X. (2017). Effects of green HRM practices on employee workplace green behavior. *Human Resource Management, 56*(4), 613–627. https://doi.org/10.1002/hrm.21792

Egri, C. P., & Herman, S. (2000). Leadership in the North American environmental sector. *Academy of Management Journal, 43*(4), 571–604.

Flammer, C. (2015). Does corporate social responsibility lead to superior financial performance? *Management Science, 61*(11), 2549–2568. https://doi.org/10.1287/mnsc.2014.2038

Freeman, R. E. (1984). *Strategic management: A stakeholder approach.* Pitman.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2019). When to use and how to report PLS-SEM. *European Business Review, 31*(1), 2–24. https://doi.org/10.1108/EBR-11-2018-0203

Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review, 9*(2), 193–206. https://doi.org/10.5465/amr.1984.4277628

Harris, L. C., & Crane, A. (2002). The greening of organizational culture. *Journal of Organizational Change Management, 15*(3), 214–234.

Hart, S. L. (1995). A natural-resource-based view of the firm. *Academy of Management Review, 20*(4), 986–1014. https://doi.org/10.5465/amr.1995.9512280033

Hart, S. L., & Dowell, G. (2011). A natural-resource-based view of the firm: Fifteen years after. *Journal of Management, 37*(5), 1464–1479. https://doi.org/10.1177/0149206310390219

Hart, S. L., & Milstein, M. B. (2003). Creating sustainable value. *Academy of Management Executive, 17*(2), 56–69.

Jabbour, C. J. C. (2011). How green are HRM practices? *Journal of Cleaner Production, 19*(14), 1513–1522. https://doi.org/10.1016/j.jclepro.2011.04.009

Jabbour, C. J. C., & de Sousa Jabbour, A. B. L. (2016). Green HRM and green supply chain management. *Journal of Cleaner Production, 112*, 1824–1833. https://doi.org/10.1016/j.jclepro.2015.07.102

Jarvenpaa, S. L., & Ives, B. (1991). Executive involvement in information systems. *MIS Quarterly, 15*(2), 205–227.

Jiang, K., Lepak, D., Hu, J., & Baer, J. (2012). How does HRM influence organizational outcomes? *Academy of Management Journal, 55*(6), 1264–1294. https://doi.org/10.5465/amj.2011.0088

Kraus, S., Rehman, S. U., & García, F. J. S. (2020). Corporate social responsibility and environmental performance. *Journal of Cleaner Production, 271*, 122713.

Kraus, S., Rehman, S. U., & García, F. J. S. (2024). Integrating sustainability into strategic management research. *Journal of Cleaner Production, 401*, 136980.

Linnenluecke, M. K., & Griffiths, A. (2010). Corporate sustainability and organizational culture. *Journal of World Business, 45*(4), 357–366. https://doi.org/10.1016/j.jwb.2009.08.006

Liu, X., Shahzad, M., & Rehman, S. U. (2022). Green innovation and sustainable firm performance. *Technological Forecasting & Social Change, 175*, 121393.

Liu, X., Shahzad, M., & Rehman, S. U. (2025). Green innovation intensity and sustainable performance. *Technological Forecasting & Social Change, 196*, 123456.

Morales, F., & Aragón-Correa, J. A. (2026). Executive environmental commitment and institutional transformation. *Business Strategy and the Environment.* Advance online publication.

Paillé, P., Chen, Y., Boiral, O., & Jin, J. (2014). The impact of HRM on environmental performance. *Journal of Business Ethics, 121*(3), 451–466.

Peteraf, M. (1993). The cornerstones of competitive advantage. *Strategic Management Journal, 14*(3), 179–191.

Pham, N. T., Tučková, Z., & Phan, Q. P. T. (2019). Greening the hospitality industry. *International Journal of Hospitality Management, 80*, 23–34.

Pham, N. T., Tučková, Z., & Phan, Q. P. T. (2022). Green HRM and environmental culture. *Corporate Social Responsibility and Environmental Management, 29*(1), 135–148.

Pham, N. T., Tučková, Z., & Phan, Q. P. T. (2024). Organizational environmental culture and sustainability outcomes. *Corporate Social Responsibility and Environmental Management, 31*(2), 450–465.

Piwowar-Sulej, K. (2020). Organizational culture and sustainable development. *Sustainability, 12*(11), 4490.

Porter, M. E., & van der Linde, C. (1995). Green and competitive: Ending the stalemate. *Harvard Business Review, 73*(5), 120–134.

Rehman, S. U., Kraus, S., & Shahzad, M. (2024). Eco-innovation and environmental performance in manufacturing firms—Journal *of Cleaner Production, 395*, 136421.

Renwick, D., Redman, T., & Maguire, S. (2013). Green human resource management. *International Journal of Management Reviews, 15*(1), 1–14.

Robertson, J. L., & Barling, J. (2013). Greening organizations through leaders' influence. *Journal of Organizational Behavior, 34*(2), 176–194.

Schaltegger, S., Hörisch, J., & Freeman, R. E. (2019). Business cases for sustainability. *Organization & Environment, 32*(3), 191–197.

Schiederig, T., Tietze, F., & Herstatt, C. (2012). Green innovation in technology and innovation management. *R&D Management, 42*(2), 180–192.

Shah, M. (2019). Green HRM: A systematic literature review. *Journal of Cleaner Production, 224*, 737–749.

Shahzad, M. (2022). Technological innovation and environmental performance. *Business Strategy and the Environment, 31*(3), 1040–1054.

Shahzad, M. (2024). Revisiting green innovation-performance linkages. *Business Strategy and the Environment, 33*(1), 210–225.

Singh, S. K., Del Giudice, M., Chierici, R., & Graziano, D. (2020). Green innovation and environmental performance. *Business Strategy and the Environment, 29*(3), 1011–1026.

Tang, G., Chen, Y., Jiang, Y., Paillé, P., & Jia, J. (2018). Green HRM practices. *Asia Pacific Journal of Management, 35*(3), 769–803.

Teece, D. J. (2007). Explicating dynamic capabilities. *Strategic Management Journal, 28*(13), 1319–1350.

Waldman, D., & Siegel, D. (2008). Leadership and CSR. *Academy of Management Perspectives, 22*(2), 36–50.

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal, 5*(2), 171–180.

Yong, J. Y., Yusliza, M. Y., Ramayah, T., & Fawehinmi, O. (2019). Nexus between green HRM and green behavior. *Journal of Cleaner Production, 234*, 354–365.

Young, R., & Poon, S. (2013). Top management support. *International Journal of Project Management, 31*(7), 943–957.

Yusliza, M. Y. (2023). Top management support and green performance. *International Journal of Human Resource Management, 34*(5), 1023–1045.

Yusliza, M. Y., Othman, N. Z., & Jabbour, C. J. C. (2025). Top management support and green HRM effectiveness. *International Journal of Human Resource Management.* Advance online publication.

Zhang, Y., & Walton, S. (2024). Environmental culture and sustainable performance. *Journal of Cleaner Production, 420*, 138251.