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Transformational leadership dimensions impact on sustainable performance of manufacturing SMEs in developing countries: Environmental performance as a mediator

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ABSTRACT

Sustainable development has emerged as a strategic priority globally, with environmental responsibility increasingly linked to business competitiveness. For manufacturing small and medium-sized enterprises (SMEs), aligning economic and environmental objectives is essential for long-term viability. Grounded in the Resource-Based View (RBV), this study examines how transformational leadership (TL) dimensions—Charisma, Inspirational Motivation, Intellectual Stimulation, and Individualized Consideration—affect both Environmental Performance (EP) and Economic Performance (ECONP), and explores EP's mediating role in these relationships. Survey data from 199 SME owners and managers in Yemen were analyzed using partial least squares structural equation modeling (PLS-SEM) via SmartPLS. The results reveal that TL dimensions exert differentiated effects on EP and ECONP, with EP significantly mediating these pathways. These findings underscore the contextual nature of leadership's impact on sustainable performance and highlight the strategic value of environmental initiatives in enhancing profitability. The study offers actionable insights for SME leaders and policymakers, advocating for context-sensitive leadership practices and targeted policy interventions to strengthen SMEs' contributions to sustainable development.

Keywords: economic performance, environmental performance, transformational leadership, small and medium-sized enterprises

INTRODUCTION

Small and medium-sized enterprises (SMEs) are pivotal to the economic development of both developed and developing nations. They play a crucial role in advancing sustainable development goals by generating employment, promoting sustainable industrialization, and reducing income disparities, particularly in low-income countries (Al-Dhobee et al., 2025a). Increasingly, SMEs are acknowledged as key contributors to economic growth, financial inclusion, and social progress, as well as vital instruments for poverty reduction.

However, the global transition toward sustainability poses significant challenges for SMEs, especially in developing contexts. To meet rising environmental standards, regulatory requirements, and stakeholder expectations, SMEs are compelled to adopt adaptive strategies—most notably entrepreneurial initiatives and strategic leadership—to improve their sustainable performance (Begum et al., 2020). Moreover, mounting pressure from governments, non-governmental organizations, regulators, and environmentally conscious consumers is driving firms to implement greener practices aimed at reducing their ecological impact (Adomako & Nguyen, 2020).

In this rapidly evolving business landscape, companies face fierce competition and are required to balance short-term profitability with long-term sustainability. Stakeholders, including investors and customers, are increasingly attentive to corporate social responsibility and sustainable development practices, extending beyond mere financial metrics to incorporate environmental and social dimensions (Ait Sidhoum & Serra, 2018; Chabowski et al., 2011).

The rising complexity of climate regulations, policy shifts, technological innovations, and changing consumer behaviors exerts significant pressure on organizations to enhance their environmental stewardship and strive toward sustainability. In response, SMEs are increasingly expected to implement green leadership practices and encourage environmental knowledge sharing. Consequently, there is a pressing need to investigate how strategic leadership influences the sustainable performance of firms across environmental, economic, and social domains (Ghazilla et al., 2015; Piwowar-Sulej & Iqbal, 2023).

The manufacturing sector, which is a substantial contributor to the economic development of emerging economies, often prioritizes economic returns over environmental or social considerations (Fuzi et al., 2020). However, mounting environmental issues and escalating stakeholder pressures are prompting a reevaluation of such practices (Adomako & Nguyen, 2020; Iqbal, 2018; Wu et al., 2015). Although considerable research has focused on environmental performance, there remains limited consensus regarding why firms exhibit divergent outcomes in this domain.

This gap has motivated scholars and practitioners to investigate underexplored dimensions within the sustainability discourse. For instance, SMEs in Yemen face significant barriers, including insufficient financial, logistical, and strategic resources, as well as a shortage of qualified human capital. Although SMEs in developing countries often prioritize financial performance, the growing demand for lean manufacturing and sustainable practices creates substantial obstacles. To address these, SMEs must initiate both organizational and individual transformations, such as enhancing leadership capacity, improving employee competencies in lean production, and bolstering environmental performance.

Leadership, particularly transformational leadership (TL) is widely recognized as a pivotal driver of organizational success. TL has been consistently associated with profitability and growth (Bass & Riggio, 2006). However, its contribution to advancing social and environmental sustainability remains underexplored, particularly within small and medium-sized enterprises (SMEs) (Gloria, 2025; Waldman & Siegel, 2008). This section identifies major gaps in the literature regarding the multidimensional effects of TL on economic and environmental performance (ECONP and EP, respectively), as well as their interrelationship.

First, most existing studies conceptualize TL as a unitary construct, overlooking the differentiated effects of its dimensions (e.g., intellectual stimulation, inspirational motivation). Further research is needed to disentangle how these dimensions influence distinct components of sustainable performance (Al-Dhobee et al., 2025c; Etomes et al., 2024; Zhu & Huang, 2023). Additionally, the role of TL in shaping employees' environmental citizenship behaviors has received limited attention (Chen et al., 2014; Robertson & Barling, 2017).

Second, the majority of studies linking strategic leadership and sustainable performance have been conducted in East Asian economies (e.g., China, Vietnam), where environmental awareness is comparatively advanced. There is a scarcity of research in Middle Eastern, African, and South Asian contexts, where SMEs operate under markedly different regulatory and socio-economic conditions. Furthermore, sector-specific analyses remain concentrated in manufacturing, leaving other industries underrepresented (Eide et al., 2020; Piwowar-Sulej & Iqbal, 2023). The lack of comparative studies in developing regions limits understanding of how institutional contexts and cultural norms moderate the TL–sustainability nexus (Manzoor et al., 2019).

Third, responding to recent scholarly calls (Al-Dhobee et al., 2025c; Piwowar-Sulej & Iqbal, 2023), this study aims to empirically assess how TL influences sustainable performance, with a particular focus on mediating and moderating mechanisms. Prior findings report mixed evidence regarding the TL–sustainability relationship, underscoring the need for deeper inquiry (Burawat, 2019), as the understanding of leadership and its linkage to sustainability are still limited (Pham & Kim, 2019). In line with recommendations for more precise leadership research, scholars advocate for the examination of TL's core components—rather than its aggregate construct (Hughes et al., 2018; Piwowar-Sulej & Iqbal, 2023; Van Knippenberg & Sitkin, 2013).

Fourth, the relationship between EP and economic performance (ECONP) within SMEs remains complex and context-dependent. While much of the literature identifies a positive correlation—indicating that improvements in EP often enhance ECONP (Agung Satria et al., 2023; Cek & Ercantan, 2023; Eccles et al., 2014; Miroshnychenko et al., 2017; Petrović-Ranđelović et al., 2023; Putra & Budastra, 2024; Reyes-Rodríguez et al., 2016)—other studies suggest that the link can vary by sector and geography, producing both positive and negative outcomes (Mar'ati & Darsono, 2023; Ospina-Patiño et al., 2023). Some evidence even points to adverse effects, with environmental initiatives creating cost burdens that diminish economic performance in SMEs (Afum et al., 2023; Harsanti et al., 2024; Pala & Ayaydin, 2023; Susanto & Rahardjo, 2022; Yuniawati, 2020). These contradictory findings highlight the need for further inquiry into whether EP functions as a mediator or moderator in the relationship between TL and profitability (Al-Dhobee et al., 2025b). This aligns with broader debates on the causal direction between sustainability initiatives and firm performance, where evidence supports both mutually reinforcing and trade-off perspectives (Goyal et al., 2013).

In conclusion, transformational leadership emerges as a critical yet underexamined determinant of sustainable performance in SMEs. The literature review highlights four principal gaps:

(1) Neglect of TL's multidimensional structure,

(2) Lack of research in underrepresented geographic and sectoral contexts,

(3) Insufficient exploration of mediators and moderators,

(4) The ambiguous, context-sensitive relationship between ECONP and EP.

This study responds to these gaps by proposing a research framework (see **Figure 1**) that explores how TL dimensions drive sustainability outcomes in SMEs, with an emphasis on developing and transitional economies.

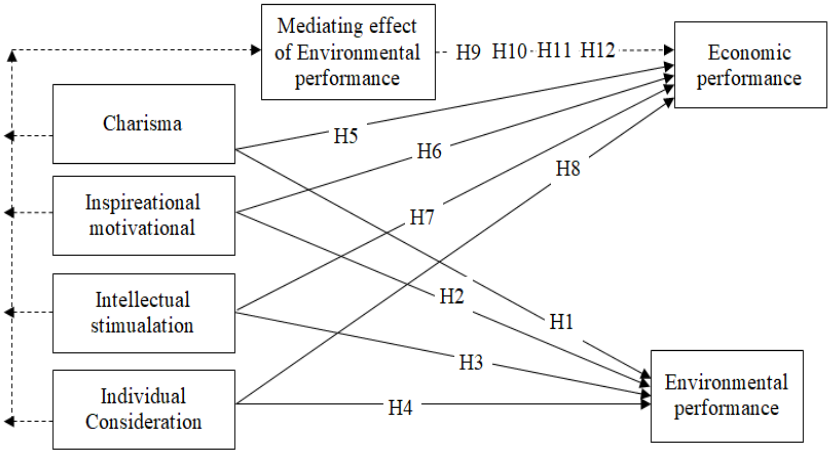

Figure 1. Conceptual framework of the study (Source: Authors' own elaboration)

LITERATURE REVIEW

Transformational Leadership

Transformational leadership has become a cornerstone of modern management research (Bass, 1999). First introduced by Burns (1978) and later refined by Bass (1985), TL provides a theoretical framework for understanding how leaders inspire followers to transcend self-interest and pursue collective goals. Transformational leaders motivate employees to internalize organizational values and align their efforts with long-term visions of growth and change (Bass & Riggio, 2006).

The TL construct is commonly operationalized through four dimensions:

(1) Idealized influence, referring to leaders' ability to build trust and act as role models;

(2) Inspirational motivation, involving the articulation of an inspiring vision;

(3) Intellectual stimulation, which encourages creative problem-solving and challenges existing assumptions; and

(4) Individualized consideration, emphasizing support for followers' unique needs and potential (Al-Dhobee et al., 2025c; Judge & Piccolo, 2004).

Firm Performance

There have not been one confirmed definition of firm performance within the current literature. Firm performance is typically defined as an indicator of an organization's progress in achieving its strategic goals (Koohang et al., 2017). It is a critical determinant of long-term competitiveness and organizational survival, especially in rapidly evolving markets (Wang et al., 2016). While much of the traditional literature has emphasized tangible firm-level resources such as capital and labor—as determinants of performance, more recent scholarship has highlighted the vital role of leadership as a performance driver (Lee, 2018).

Economic Performance (ECONP)

Economic performance (ECONP) is a fundamental component of organizational performance and has been extensively explored in management and organizational research (Nguyen et al., 2020). It is commonly assessed through a range of financial indicators, such as profitability, return on investment (ROI), return on assets (ROA), and market value, which together provide a comprehensive measure of an organization's financial stability and strategic effectiveness (Tien et al., 2020; Trinh et al., 2020). According to Green et al. (2012), economic performance encompasses financial outcomes related to cost efficiency, asset utilization, profit generation, and market share expansion. Collectively, these indicators function as standardized benchmarks for evaluating an organization's capacity to sustain fiscal health and achieve long-term economic sustainability.

Accordingly, as this research is intended to be conducted in a developing country and for the purpose of the study, SMEs' economic performance can be identified as the firm's capability to increase profitability, investment, production, sales, and assets.

Environmental Performance (EP)

Environmental performance refers to the extent to which an organization minimizes its negative environmental impacts and aligns with sustainability expectations. In an early literature review, Metcalf et al. (1995) noted that while few studies directly addressed environmental performance measurement systems, most focused instead on the attributes of effective monitoring frameworks. More recently, Djoutsa Wamba et al. (2020) offered a more operational definition, describing environmental performance as the reduction of adverse ecological effects resulting from a company's operations, coupled with society's perception of those impacts. This dual perspective underscores both measurable outcomes (e.g., emissions reduction, resource efficiency) and stakeholder evaluations in defining environmental sustainability. Accordingly, as this research is intended to be conducted in a developing country and for the purpose of the study, SMEs' environmental performance can be defined as the firm's commitment and ability to reduce emissions, waste, and environmental harm while efficiently utilizing resources.

Theoretical Background

Resource-based view theory

The Resource- Based View Theory (RBVT) conceptualizes a firm as a bundle of organizational, human, and physical resources both tangible and intangible. According to Barney (1991), resources that are valuable, rare, inimitable, and non-substitutable (VRIN) serve as the basis for achieving sustainable competitive advantage, which in turn underpins long-term performance sustainability. Within the RBV framework, transformational leadership (TL) can be viewed as a strategic VRIN resource. Leaders who inspire, intellectually stimulate, and demonstrate individualized consideration foster distinct organizational capabilities that are difficult for competitors to replicate. This internal strength becomes particularly significant when it aligns with the firm's environmental and economic objectives.

Barney et al. (2001) emphasized that RBVT includes human capital, particularly employees' skills, as intangible resources critical to performance. The theory asserts that a firm's internal capabilities such as leadership, human capital, and knowledge are vital for driving competitive advantage, particularly for small and medium-sized enterprises (SMEs), which often operate with limited external resources.

Barney (1991) also highlighted that RBV encompasses a wide range of internal resources, including tangible assets, financial capital, organizational infrastructure, and human competencies. In this context, Zhang and Wei (2021) extended the natural-resource based view (a branch of RBV) in two key directions. First, they examined how stakeholder dynamics and strategic mechanisms such as sustainable development and product stewardship are influenced by SME leaders' charisma and vision in achieving both environmental and financial goals. Second, they explored how SMEs can derive competitive advantage from natural environmental strategies that enhance financial outcomes.

Additionally, previous studies (e.g., Ahsan, 2024; Iqbal et al., 2020; Price & Stoica, 2015) have consistently demonstrated the applicability of RBVT to the SME context, reinforcing the theory's relevance in explaining how internal capabilities especially leadership drive sustainable performance outcomes.

In conclusion, TL fits the framework of firms valuable resource because it represents an intangible capability embedded in human capital that rivals cannot easily replicate (Ahsan, 2024; Barney, 1991; Varadarajan, 2023). By motivating and inspiring employees to exceed expectations, transformational leaders convert internal resources such as employee skills, knowledge, and commitment into strategic outcomes that enhance financial, social, and environmental performance (Özgül & Zehir, 2023). This makes TL not just a leadership style but a core organizational resource that strengthens resilience, drives innovation and creativity, and supports long-term sustainability (Afsar et al., 2019; Karimi et al., 2023; Lin et al., 2022). Systematic reviews confirm TL's consistent association with environmental and sustainable outcomes under RBV logic (Piwowar-Sulej & Iqbal, 2023). Thus, RBV provides a theoretical foundation for viewing transformational leadership as a critical source of enduring competitive advantage (Afzal & Tumpa, 2024; Khaddage-Soboh et al., 2024).

HYPOTHESES DEVELOPMENT

Transformational Leadership and Environmental Performance

Transformational leadership (TL) has attracted considerable scholarly attention due to its dual influence on both economic and environmental performance, particularly within the framework of sustainable business practices. Beyond the pursuit of financial returns, transformational leaders are increasingly recognized for their ability to align internal operations with sustainability goals through green initiatives and human-centered strategies.

Hanif et al. (2023) demonstrated that green transformational leadership (GTL) exerts a significant influence on corporate environmental performance, both directly and indirectly, through green process innovation. Evidence from survey-based research in China corroborates these findings, revealing that TL fosters pro-environmental behavior at both the individual and organizational levels. Burawat (2019), using a mixed-methods approach, examined Thai SMEs and found that lean manufacturing partially mediates the relationship between TL and sustainability performance. Similarly, Riva et al. (2021) identified green knowledge and GTL as critical drivers of green creativity, which, in turn, enhances environmental performance.

Further, Farrukh et al. (2022) established that supervisors who embody GTL traits promote green employee behaviors through the mediating role of green human resource management (HRM), with environmental knowledge acting as a moderator. Consistent with these results, Purwanto et al. (2024) reported that eco-conscious TL positively influences both green HRM and green innovation, thereby improving environmental outcomes in East Java SMEs. Le et al. (2024) and Ledi et al. (2024) provided supporting evidence from Vietnam and other emerging markets, highlighting that GTL enhances both environmental and economic performance through pathways such as green innovation and HR engagement.

Additionally, Lin et al. (2022) confirmed GTL's role in advancing sustainable performance, while Li et al. (2020) and Para-González et al. (2018) showed that TL significantly contributes to corporate environmental performance. Robertson and Barling (2017) distinguished between environmentally specific and general TL, concluding that they are empirically distinct yet related constructs. Transformational leadership—defined by idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration—drives employee innovation, thereby advancing organizational sustainability (Karimi et al., 2023).

Moreover, intellectual stimulation has been identified as a predictor of strategically oriented sustainability initiatives, as it fosters creative problem-solving and novel approaches to environmental challenges (Waldman et al., 2006). TL further contributes to employee engagement and performance by encouraging proactive follower behaviors, such as strength

utilization and personal initiative (Bakker et al., 2022). Leaders who exemplify intellectual stimulation encourage employees to reconsider assumptions and reframe sustainability challenges (Eide et al., 2020). Empirical evidence also suggests that employee sustainable performance is positively influenced by TL (Jiang et al., 2017).

In addition, TL supports the adoption of green HRM (Jia et al., 2018) and facilitates the development of a green psychological climate (Zhou et al., 2018). Graves et al. (2013) and Graves and Sarkis (2018) further demonstrated that TL fosters autonomous employee motivation toward sustainability, promoting pro-environmental behaviors. Similarly, Afsar et al. (2019) emphasized that TL dimensions collectively enhance employee sustainability-oriented performance, ultimately contributing to improved environmental outcomes. Khaddage-Soboh et al. (2024) and Gloria (2025) confirmed the critical role of TL in driving sustainability efforts.

Based on these insights, the following hypotheses are proposed:

H1: Charisma has a positive impact on the environmental performance of SMEs.

H2: Inspirational motivation has a positive impact on the environmental performance of SMEs.

H3: Intellectual stimulation has a positive impact on the environmental performance of SMEs.

H4: Individualized consideration has a positive impact on the environmental performance of SMEs.

Transformational Leadership and Economic Performance

The relationship between TL and economic performance has received increasing attention in management and sustainability literature, particularly within the SME context. TL, characterized by charisma, inspirational motivation, intellectual stimulation, and individualized consideration, has been shown to positively influence a wide range of organizational outcomes that extend beyond traditional financial indicators (Le & Lei, 2018b; Thomson III et al., 2016).

Transformational leaders inspire employees to achieve high performance and managerial excellence (García-Morales et al., 2012; Nguyen et al., 2017). GTL, which integrates environmental values, further enhances both environmental and economic performance through mediators such as green innovation and HRM practices (Le et al., 2024). Son et al. (2020) found that TL exerts a stronger effect on financial performance than other leadership approaches, while Eikelenboom and de Jong (2019) linked TL to improved integrative capabilities that enhance organizational adaptability and sustainable outcomes.

Further evidence from Manzoor et al. (2019) and Asad (2024) suggests that TL not only predicts job performance but also moderates the effectiveness of environmental management strategies, thereby supporting long-term business sustainability. Notably, TL is among the most widely studied leadership perspectives in management research (Lord et al., 2017), and intellectual leadership in particular has been shown to significantly improve economic sustainability performance (Zhao et al., 2022).

Intellectual stimulation—one of TL's core dimensions—encourages employees to question assumptions, reframe organizational challenges, and devise innovative solutions (Bass & Steidlmeier, 1999). Leaders who adopt this dimension also demonstrate greater environmental scanning and stakeholder responsiveness, thereby enhancing economic outcomes (Du et al., 2013; Waldman et al., 2006).

Based on these insights, the following hypotheses are proposed:

H5: Charisma has a positive impact on the economic performance of SMEs.

H6: Inspirational motivation has a positive impact on the economic performance of SMEs.

H7: Intellectual stimulation has a positive impact on the economic performance of SMEs.

H8: Individualized consideration has a positive impact on the economic performance of SMEs.

Impact of Transformational Leadership Dimensions on Economicperformance Mediated by Environmental Performance

Transformational leadership has also been shown to enhance economic performance indirectly through environmental performance, which functions as a mediating variable. Research by Khan and Khan (2022) confirmed that TL fosters environmental initiatives by cultivating a green organizational culture, which subsequently improves economic outcomes through cost savings, innovation, and enhanced stakeholder satisfaction. Similarly, Iqbal et al. (2020) found that sustainability-oriented leadership practices significantly mediate firm performance when aligned with long-term economic strategies.

Intellectual stimulation, in particular, drives environmentally oriented problem-solving, resulting in competitive advantages and superior economic outcomes (García-Morales et al., 2012). Shahzad et al. (2022) provided further evidence, demonstrating that TL exerts a positive influence on firm performance, with sustainability mediating the effect of leadership on organizational outcomes. Complementary findings by Zhao et al. (2022) highlighted that intellectual leadership improves economic sustainability performance via environmental competitive advantage, underscoring the strategic role of TL in simultaneously advancing ecological and financial goals.

Despite these findings, gaps remain in understanding the relative influence of TL dimensions on economic outcomes mediated by environmental improvements. For instance, Peng et al. (2021) found that environmentally specific TL positively impacts team pro-environmental behaviors through mediators such as goal clarity and harmonious passion, suggesting complex pathways of influence.

Based on these insights, the following hypotheses are proposed:

H9: Environmental performance mediates the relationship between charisma and economic performance of SMEs.

H10: Environmental performance mediates the relationship between inspirational motivation and economic performance of SMEs.

H11: Environmental performance mediates the relationship between intellectual stimulation and economic performance of SMEs.

H12: Environmental performance mediates the relationship between individualized consideration and economic performance of SMEs.

METHODOLOGY

Data and Sample

This study employed a quantitative research design, collecting data from strategic managers working in Yemeni manufacturing SMEs. The sample was selected using a stratified sampling method across eight Yemeni cities, including the major industrial hubs where most manufacturing SMEs are concentrated.

Data were collected through a structured questionnaire survey administered using both face-to-face (drop-off) and electronic distribution methods (Google Forms and WhatsApp). The survey distribution process was conducted between June and December 2023. Out of 440 questionnaires distributed, 213 responses were received. After screening for completeness and accuracy, 199 valid questionnaires were retained for analysis, yielding a response rate of 45.22%.

Although the relatively small sample size represents a limitation, the dataset satisfies the minimum sample requirement for partial least squares–structural equation modeling (PLS-SEM). According to Hair et al. (2012, 2019) and Memon et al. (2020), PLS-SEM is suitable for small to medium-sized samples and remains robust in predictive modeling. Moreover, PLS-SEM does not assume normal data distribution, making it appropriate for nonparametric data (Hair et al., 2017). A bootstrapping procedure with 5,000 subsamples was applied to assess the significance of path coefficients.

Respondents provided data using a multi-item measurement instrument with a seven-point Likert scale (ranging from strongly disagree = 1 to strongly agree = 7).

Measures

Transformational leadership was measured using a 13-item scale adapted from Aslan et al. (2011). Environmental performance and economic performance were measured using four and five items, respectively, adopted from Abdul-Rashid et al. (2017). Although the questionnaire used in the survey as a primary data collection tool was adopted from previous literature, its validity and reliability were ensured. A pilot study was conducted with twenty SMEs to reassess the validity and reliability of the questionnaire, and the responses from this pilot test were excluded from the final analysis.

RESULT AND DISCUSSION

Using partial least squares structural equation modeling (PLS-SEM), the relationships among the hypothesized variables were analyzed. This method was selected because of the relatively small sample size and the suitability of PLS-SEM for prediction-oriented research and non-normally distributed data (Hair et al., 2019). The study aimed to determine the

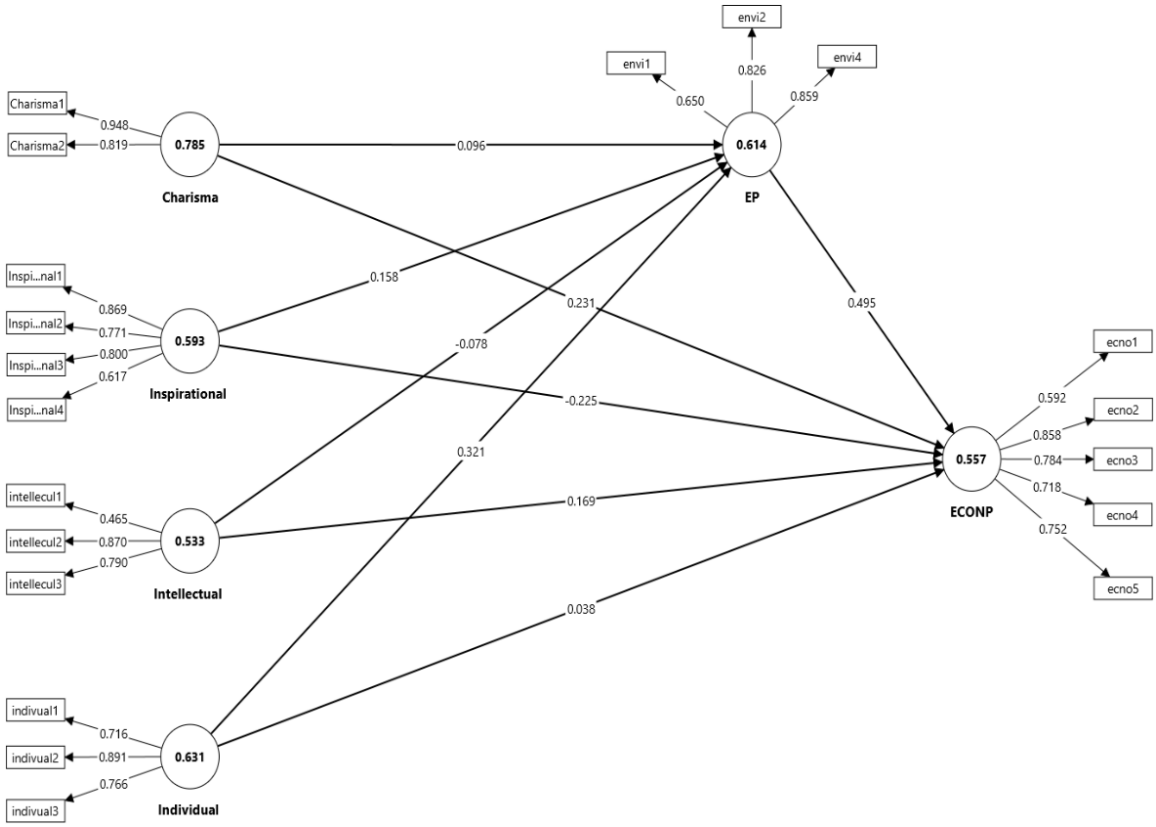

Figure 2. Measurement model (Source: Authors' own elaboration of PLS v 4.1.1.6 analysis result)

Table 1. Outer loading

Construct	Charisma	ECONP	EP	Individual	Inspirational	Intellectual
Charisma1	0.948					
Charisma2	0.819					
Inspirational1					0.869	
Inspirational2					0.771	
Inspirational3					0.800	
Inspirational4					0.617	
Econp1		0.592				
Econp2		0.858				
Econp3		0.784				
Econp4		0.718				
Econp5		0.752				
Envi1			0.650			
Envi2			0.826			
Envi4			0.859			
Indivual1				0.716		
Indivual2				0.891		
Indivual3				0.766		
Intellecul1						0.465
Intellecul2						0.870
Intellecul3						0.790

Table 2. Composite reliability and AVE

Construct	Composite reliability (rho_c)	Average variance extracted (AVE)
Charisma	0.879	0.785
Individual	0.836	0.631
Inspirational	0.852	0.593
Intellectual	0.763	0.533
ECONP	0.861	0.557
EP	0.825	0.614

Table 3. HTMT

Construct	Charisma	ECONP	EP	Individual	Inspirational	Intellectual
Charisma						
ECONP	0.405					
EP	0.291	0.708				
Individual	0.429	0.435	0.507			
Inspirational	0.470	0.156	0.320	0.446		
Intellectual	0.499	0.342	0.219	0.637	0.634	

effects of transformational leadership (TL) dimensions—charisma, inspirational motivation, intellectual stimulation, and individualized consideration—on the economic performance of SMEs, with environmental performance as a mediating variable. The analysis was conducted in two stages:

(1) Assessment of the measurement model and

(2) Assessment of the structural model.

PLS-SEM Measurement Model Results

Figure 2 presents the research framework. The measurement model was assessed through four main steps.

Outer loadings and convergent validity

All factor loadings exceeded the 0.60 threshold, except for four items with loadings of 0.650, 0.617, 0.592, and 0.465. However, these were retained because they satisfied Hair et al.'s (2019) recommendation that loadings above 0.40 can be accepted if other reliability and validity measures are adequate see **Table 1** and **Figure 2**.

Internal consistency reliability

As shown in **Table 2**, Composite reliability (CR) values for all constructs were above the recommended threshold of 0.70, confirming strong internal consistency.

Convergent validity

Average variance extracted (AVE) values for all constructs as illustrated in **Table 2** and **Figure 2**, exceeded 0.50, indicating sufficient convergent validity.

Discriminant validity

Three methods were applied: Fornell–Larcker criterion, cross-loadings, and heterotrait-monotrait (HTMT) ratio. HTMT values were all below the 0.90 threshold suggested by Henseler et al. (2015) (**Table 3**), and the other two methods similarly confirmed discriminant validity (**Tables 4** and **5**).

Table 4. Fornell and lareker

Construct	Charisma	ECONP	EP	Individual	Inspirational	Intellectual
Charisma	0.886					
ECONP	0.327	0.746				
EP	0.229	0.528	0.784			
Individual	0.311	0.285	0.370	0.795		
Inspirational	0.374	0.075	0.254	0.297	0.770	
Intellectual	0.325	0.224	0.137	0.350	0.452	0.730

Table 5. Cross loading

Dimension	Charisma	Inspirational	Intellectual	Individual	ECONP	EP
Charisma1	0.948	0.335	0.332	0.315	0.331	0.274
Charisma2	0.819	0.343	0.224	0.218	0.230	0.085
Inspirational1	0.370	0.869	0.438	0.242	0.143	0.252

Table 6. VIF value

Dimension	VIF
Charisma1	1.544
Charisma2	1.544
Inspirational1	2.016
Inspirational2	1.883
Inspirational3	1.869
Inspirational4	1.586
Econp1	1.273
Econp2	2.262
Econp3	1.888
Econp4	1.435
Econp5	1.626
Envi1	1.119
Envi2	1.771
Envi4	1.742
Indivual1	1.254
Indivual2	1.580
Indivual3	1.546
Intellecul1	1.121
Intellecul2	1.251
Intellecul3	1.261

PLS-SEM Structural Model Results

Before testing the hypothesized relationships, multicollinearity, R2, Q2, and common method bias were examined.

Common method bias

Procedural and statistical remedies were applied to address common method bias (CMB). Respondents were assured of anonymity, and they were informed that there were no right or wrong answers, consistent with Podsakoff et al. (2012). Statistically, Harman's single-factor test indicated that a single factor explained 22.74% of the variance, below the 50% threshold, suggesting that CMB was not a concern. Furthermore, following Kock (2015), a full collinearity assessment was conducted. Variance inflation factor (VIF) values for all constructs, illustrated in **Table 6**, were below 5, confirming the absence of CMB.

R2 and Q2 values

The coefficient of determination (R2) values, provided in **Table 7**, showed that TL dimensions explained 36.8% of the variance in economic performance and 17.0% in environmental performance. According to Hair et al. (2019), these values indicate moderate explanatory power. Predictive relevance (Q2) values as illustrated in **Table 7** were 0.114 for economic performance and 0.122 for environmental performance, both exceeding zero and thus indicating predictive validity of the model.

Table 7. R2 and Q2 values

Construct	R-square	Q-square
ECONP	0.368	0.114
EP	0.170	0.122

Direct Relationship

The current study employed the PLS-SEM bootstrapping technique with 5,000 sub-samples to assess the structural model. As presented in Table 8, the results reveal mixed support for the proposed hypotheses. Regarding environmental performance, Charisma does not exert a significant positive influence ($\beta = 0.096$, $t = 1.197$, $p > 0.005$), thereby H1 is not supported. In contrast, Inspirational Motivation shows a significant positive effect ($\beta = 0.158$, $t = 2.277$, $p < 0.005$), thus H2 is supported. Intellectual Stimulation does not significantly enhance environmental performance ($\beta = -0.078$, $t = 0.920$, $p > 0.005$), leading to the rejection of H3. However, Individual Consideration demonstrates a significant positive impact ($\beta = 0.321$, $t = 2.655$, $p < 0.005$), supporting H4.

With respect to economic performance, Charisma significantly contributes to improved outcomes ($\beta = 0.231$, $t = 2.676$, $p < 0.005$), supporting H5. Interestingly, Inspirational Motivation exhibits a significant negative effect ($\beta = -0.225$, $t = 2.767$, $p < 0.005$), thereby H6 is not supported. Intellectual Stimulation positively influences economic performance ($\beta = 0.169$, $t = 2.108$, $p < 0.005$), confirming H7. Conversely, Individual Consideration does not show a significant positive effect ($\beta = 0.038$, $t = 0.256$, $p > 0.005$), resulting in the rejection of H8.

All hypotheses and their corresponding statistical outcomes are clearly summarized in **Table 8**, which serves as the central reference for interpreting the model's predictive validity across both environmental and economic performance dimensions.

Table 8. Direct effect results

Hypotheses	Path	β	S E	T values	P values	Decision
H1	Charisma -> EP	0.096	0.080	1.197	0.231	Not supported
H2	Inspirational -> EP	0.158	0.070	2.277	0.023	Supported
H3	Intellectual -> EP	-0.078	0.085	0.920	0.358	Not supported
H4	Individual -> EP	0.321	0.121	2.655	0.008	Supported
H5	Charisma -> ECONP	0.231	0.086	2.676	0.007	Supported
H6	Inspirational -> ECONP	-0.225	0.081	2.767	0.006	Not supported
H7	Intellectual -> ECONP	0.169	0.080	2.108	0.035	Supported
H8	Individual -> ECONP	0.038	0.147	0.256	0.798	Not supported

Table 9. Indirect effect results

Path	B	SD	T value	P value	Decision
Ch → EP→ ECONP	0.047	0.044	1.084	>0.05	Not Supported
INSP→EP→ECONP	0.078	0.037	2.147	<0.05	Supported
INTEL→EP→ECONP	-0.034	0.045	0.862	>0.05	Not Supported
INDIV→EP→ECONP	0.159	0.064	2.466	<0.05	Supported

Note: SE = standard error; CH = Charisma; INSP = Inspirational, Intel = Intellectual, INDI= Individual, EP = environmental performance; ECONP = economic performance

Indirect Relationship

Table 9 presents the results of the mediation analysis, which examined the mediating role of EP in the relationship between the four dimensions of transformational leadership (Charisma, Inspirational Motivation, Intellectual Stimulation, and Individual Consideration) and economic performance. The findings indicate that EP does not significantly mediate the relationship between Charisma and economic performance ($\beta = 0.047$, $t = 1.084$, $p > .05$), leading to the rejection of H9. However, EP partially mediates the relationship between Inspirational Motivation and economic performance ($\beta = 0.078$, $t = 2.147$, $p < .05$), thereby supporting H10. In contrast, no significant mediation effect is observed between Intellectual Stimulation and economic performance ($\beta = -0.034$, $t = 0.862$, $p > .05$), resulting in the rejection of H11. Finally, the results reveal a full mediation effect of EP in the relationship between Individual Consideration and economic performance ($\beta = 0.159$, $t = 2.466$, $p < .05$), thus supporting H12.

All mediation hypotheses and their corresponding statistical outcomes are clearly summarized in **Table 9**.

DISCUSSION

This study provides several important insights into the relationship between transformational leadership (TL), environmental performance (EP), and economic performance (ECONP) within the context of manufacturing SMEs in Yemen. Consistent with Khan and Khan (2022), the findings reaffirm the strategic relevance of TL in navigating volatile and complex environments. Drawing on Aslan et al. (2011), TL is conceptualized through four dimensions: Idealized Influence (Charisma), Inspirational Motivation, Intellectual Stimulation, and Individualized Consideration. Each dimension contributes uniquely to shaping EP by fostering innovation, behavioural adaptability, and serving as a catalyst for organizational change. These leadership traits are instrumental in promoting pro-environmental behaviours and enhancing organizational capabilities for sustainable performance (Robertson & Barling, 2017).

Unexpectedly, Charisma and Intellectual Stimulation, as illustrated in Table 8, did not exhibit significant effects on EP. This outcome aligns with Al-Dhobee et al. (2025c), who similarly reported non-significant associations between Charisma and EP. However, it diverges from findings by Zaman et al. (2024) and Faqera and Manaf (2024), who identified positive relationships between charismatic leadership and sustainability outcomes. Likewise, Eide et al. (2020) and Faqera and Manaf (2024) observed significant effects of Intellectual Stimulation on environmental initiatives. A plausible explanation lies in the contextual realities of SMEs operating in conflict-affected or economically unstable environments, where leaders may prioritize immediate economic survival over long-term environmental objectives (Al-Dhobee et al., 2025c). Moreover, Intellectual Stimulation may be less effective in developing economies due to limited employee literacy and insufficient environmental awareness, which constrain leaders' ability to mobilize staff toward sustainability goals (Al-Dhobee et al., 2025c).

Conversely, Inspirational Motivation and Individualized Consideration (as shown in **Table 8**) were found to significantly influence EP. Inspirational Motivation involves articulating a compelling vision that aligns employee efforts with sustainability objectives. Leaders who employ inspirational messaging can foster a sense of purpose and collaboration, motivating employees to adopt sustainable practices and contribute to innovation (Ren et al., 2024). Similarly, Individualized Consideration, which emphasizes attending to each employee's unique needs and potential, was positively associated with EP by fostering a supportive climate for pro-environmental behavior (Ren et al., 2024). These findings are consistent with Faqera and Manaf (2024) and Al-Dhobee et al. (2025c), though they contrast with Faqera and Manaf (2024) regarding the role of Inspirational Motivation. Such inconsistencies suggest that these relationships are context-dependent and merit further investigation. As recommended by Al-Dhobee et al. (2025c) and Eide et al. (2020), future research should explore potential mediators and moderators—a direction adopted in this study.

Regarding the impact of TL dimensions on ECONP, the results indicate that Idealized Influence, Inspirational Motivation, and Intellectual Stimulation are significantly associated with economic outcomes, while Individualized Consideration is not. Leaders exhibiting Idealized Influence serve as role models, fostering trust and alignment with organizational goals. In SMEs, charismatic leadership can motivate employees to integrate personal aspirations with organizational objectives, thereby enhancing economic performance. Intellectual Stimulation promotes innovation and critical thinking, enabling employees to explore novel approaches to improving economic outcomes.

However, the negative association between Inspirational Motivation and ECONP may reflect the socio-economic and institutional constraints faced by SMEs in fragile environments. In such contexts, visionary leadership may inadvertently divert attention and resources from immediate operational needs, leading to strategic misalignment and reduced short-term economic outcomes. Moreover, in environments characterized by uncertainty and resource scarcity, idealistic leadership messages may be perceived as disconnected from employees' lived realities. This disconnect can result in skepticism, reduced motivation, or disengagement, particularly when basic organizational needs remain unmet.

Similarly, the limited impact of Individualized Consideration on ECONP may reflect contextual constraints. In developing economies, leaders may struggle to address individual employee needs equitably, often prioritizing high performers while neglecting others. This imbalance may diminish the overall effectiveness of Individualized Consideration in driving economic outcomes. Teoh et al. (2022) support this interpretation, noting that among TL dimensions, only Idealized Influence and Inspirational Motivation significantly enhance employee performance, while Individualized Consideration does not.

In sum, leadership effectiveness is inherently context-specific (Zheng et al., 2022). In conflict-affected environments, firms face multifaceted challenges, including financial instability, logistical disruptions, and infrastructure breakdowns. TL is particularly salient in such settings, as it enables strategic adaptation and resilience. Charismatic leaders act as mentors and role models, instilling confidence and commitment during crises (Feranita et al., 2020; Gachira & Ntara, 2024; Jabbour Al Maalouf et al., 2025). Through Inspirational Motivation, they foster optimism and goal alignment, encouraging employees to exceed expectations despite adversity (Feranita et al., 2020; Gachira & Ntara, 2024). Intellectual Stimulation equips employees to innovate and overcome operational challenges, such as energy shortages or transportation disruptions (Al-Dhobee et al., 2025c). Individualized Consideration reinforces commitment by addressing followers' unique needs (Al-Dhobee et al., 2025c).

Anchored in the Resource-Based View (RBV), TL leverages internal, immobile, and heterogeneous resources to generate competitive advantage. Leaders' knowledge, communication, and inclusivity serve as strategic assets that drive organizational survival and sustainable outcomes in conflict-affected settings (Al-Shami et al., 2023; Barney, 1991).

Finally, the study confirms the mediating role of EP in the relationship between TL dimensions and ECONP. In Model 1 (direct effects), Charisma and Intellectual Stimulation positively influence ECONP. However, in Model 2 (indirect effects as shown in **Table 9**), with EP included, these direct relationships become non-significant, while Inspirational Motivation and Individualized Consideration maintain significant indirect effects via EP. This suggests that the influence of TL on economic performance is contingent upon environmental performance, reinforcing EP's role as a mediating variable. These findings align with the argument that sustainability initiatives often require time to yield measurable economic returns, posing methodological challenges for empirical research (Hojnik & Ruzzier, 2016). Moreover, the directionality between sustainability and firm performance remains contested (Anser et al 2024; Goyal et al., 2013; Martínez-Falcó et al., 2024). Typically, firms implementing environmental strategies prioritize resource efficiency (e.g., water, energy) to reduce operational costs. These improvements often manifest initially in operational income growth before translating into broader financial gains (Eide et al., 2020).

IMPLICATIONS & LIMITATION

Theoretical Implication

This study proposed and empirically tested a research model examining the influence of transformational leadership (TL) dimensions on economic performance (ECONP), with environmental performance (EP) as a mediating variable in the context of Yemeni manufacturing SMEs. By grounding the analysis in the resource-based view (RBV) theory, the study highlights the role of leadership as a strategic resource that fosters both environmental and economic capabilities within firms. In doing so, it enriches the literature on sustainable performance strategies and the interplay between leadership, environmental practices, and business outcomes (Eide et al., 2020).

Several key contributions emerge from the findings

Multidimensional approach to TL. Unlike prior research that often treated TL as a unidimensional construct, this study provides empirical evidence of the distinct effects of TL dimensions (charisma, inspirational motivation, intellectual stimulation, and individualized consideration) on ECONP.

Evidence of mediation. The study is among the first to demonstrate that EP mediates the relationship between TL and ECONP, thereby clarifying the mechanism through which leadership translates into economic outcomes.

Contextual contribution. Conducted in Yemen, one of the least developed economies, the study addresses the geographic gap in the literature. Most prior studies were situated in developed or emerging economies (Eide et al., 2020). The findings extend the generalizability of TL theory by showing its relevance for SMEs operating under resource constraints and institutional challenges.

Managerial Implications

This research provides valuable insights for managers, policymakers, and academics seeking to enhance SME sustainability in developing contexts:

For SME managers and owners

The findings highlight TL as a strategic lever for simultaneously advancing environmental and economic goals. Leaders who emphasize inspirational motivation and individualized consideration can foster a culture of environmental responsibility, which in turn supports financial sustainability. Managers should prioritize leadership development programs that enhance TL competencies across all levels of the organization. They can focus on transformational leadership (TL) competencies most relevant to SMEs, including crisis management, resource optimization, and fostering employee motivation under uncertaintycan, and specialized knowledge related to sustainability. Such training could emphasize practical skill development, such as scenario-based planning, problem-solving in resource-constrained environments, and stakeholder communication to balance economic and environmental objectives.

For policymakers

The results suggest that public policies supporting SME capacity-building, leadership training, and green innovation are likely to improve both environmental and economic performance. Policymakers in Yemen and similar contexts can design programs that incentivize the adoption of TL practices in SMEs, particularly those tied to sustainability (Álvarez-García et al., 2022). For small and medium-sized enterprises (SMEs), training owners and managers is particularly essential to achieving sustainable performance (Al-Dhobee et al., 2025a). Other competencies of leaders could be developed such are: Interdisciplinary work and learning, solidarity, planning and implementation, foresight thinking, transcultural understanding and cooperation, empathy, compassion, self-motivation, and the ability to motivate others (Raelin, 2016). In addition policy makers can set up strategy and adopt financial funding programs to support SMEs.

For academics

This study demonstrates the importance of testing TL as a multidimensional construct and incorporating environmental mediation in leadership-performance models. It provides a framework for future studies to replicate in transitional economies transitional economies, thereby expanding the theoretical and empirical boundaries of RBV in sustainability contexts.

For top management

Leaders should foster TL by encouraging team collaboration, empowering employees, and promoting creativity in addressing sustainability challenges. By embedding TL in organizational culture, managers can strengthen both green performance initiatives and long-term competitiveness.

Limitations and Future Studies

This study, like other empirical research, has certain limitations. The data were collected from a limited number of manufacturing SMEs in selected Yemeni cities. Given the unstable environment caused by ongoing conflict, the outreach to a broader population of SMEs was restricted. Future studies should therefore expand to include SMEs across all Yemeni cities to improve representativeness and generalizability.

The focus of this study was solely on manufacturing SMEs. Service-oriented SMEs, which play a vital role in developing economies, were not included. Future research should incorporate both sectors and consider other mediating and moderating variables. Moreover, longitudinal research is recommended to capture how top managers and different leadership styles influence economic and environmental performance over time.

The outcomes of transformational leadership (TL) are inherently context-dependent, and this study's findings must be interpreted within the constraints of its specific setting. Conducted in select urban centers within Yemen, the research reflects localized dynamics that may not generalize to broader national or international contexts. Prior literature has consistently highlighted that TL's influence on sustainable performance varies significantly across socio-economic and institutional environments, and that the leadership–sustainability nexus remains insufficiently explored (Al-Dhobee et al., 2025c; Ahsan, 2024; Pham & Kim, 2019; Piwowar-Sulej & Iqbal, 2023). The contextual specificity is further amplified by Yemen's unstable economic infrastructure and the absence of standardized operational frameworks, which may shape leadership behaviors and sustainability outcomes in unique ways. Future research should therefore expand sampling across diverse SME sectors and geographic regions to enhance the robustness and transferability of findings, and to uncover more nuanced patterns in the TL–sustainability relationship.

Future research should also aim to disentangle the bidirectional relationship between sustainability and firm performance. Much of the existing literature conceptualizes sustainability practices as antecedents of financial, social, or environmental outcomes. However, it is equally plausible that firms with higher performance levels are more capable of investing in sustainability initiatives (Piwowar-Sulej & Iqbal, 2023; Zhang & Wei, 2021). To clarify this relationship, longitudinal and cross-lagged panel designs could be employed to determine causality more effectively. Additionally, comparative studies between developed and developing economies are needed to investigate how contextual factors influence the strength and direction of this relationship. In particular, resource-constrained and conflict-affected environments may alter firms' ability to prioritize sustainability goals, thereby influencing the sustainability–performance nexus. Such future inquiries would contribute to a more comprehensive understanding of sustainability as both a driver and an outcome of organizational performance.

CONCLUSIONS

Sustainable development is increasingly understood through the lens of the triple bottom line, which integrates economic, environmental, and social dimensions as interdependent and mutually reinforcing objectives. Recent scholarship underscores the tangible benefits of adopting green practices, offering a more nuanced perspective on the relationship between environmental initiatives and corporate performance (Anser et al., 2024). However, despite growing recognition of sustainability's strategic value, a notable gap persists in the literature regarding how firms effectively convert environmental strategies into measurable economic outcomes and identify the internal resources necessary to enhance green performance (Martínez-Falcó et al., 2024).

Addressing this gap, the present study demonstrates that among manufacturing SMEs, environmental performance (EP) is significantly influenced by the adoption of transformational leadership (TL) strategies. These leadership dimensions—Idealized Influence, Inspirational Motivation, Intellectual Stimulation, and Individualized Consideration—exert varied and context-dependent effects on economic performance (ECONP). Importantly, EP serves as a mediating mechanism, shaping the strength and direction of the relationship between TL and ECONP.

These findings suggest that SME leaders must adopt TL dimensions that are strategically aligned with their organizational goals and contextual realities. By doing so, they can enhance both environmental and economic outcomes, contributing meaningfully to sustainable development. The study reinforces the importance of leadership as a critical internal resource and calls for targeted leadership development and policy support to enable SMEs to navigate sustainability challenges effectively.

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AI statement: The authors stated that generative artificial intelligence (AI) tools were used solely to refine the language and improve the clarity of some sentences in this manuscript. No AI tools were used to generate research content, analyze data, or develop the study's findings.

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