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Research Paper

Driving the Sustainable Competitive Advantage: The Role of Green Entrepreneurial Orientation and Green Supply Chain Management in Pakistan's Textile Firms

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Abstract

The concept of sustainable competitive advantage has become increasingly important for firms operating in environmentally sensitive industries such as the textile sector, where environmental responsibility and resource efficiency are critical for long-term performance. Grounded in the Natural Resource-Based View (NRBV), this study examines how Green Entrepreneurial Orientation (GEO) influences Sustainable Competitive Advantage (SCA) directly and indirectly through Green Supply Chain Management (GSCM). Specifically, the study conceptualizes GSCM as a mediating mechanism that translates green entrepreneurial capabilities into competitive outcomes within the context of Pakistan's textile industry. Data were collected from 185 managers working in textile firms located in major industrial cities of Pakistan, including Karachi, Lahore, Sialkot, and Multan. The hypotheses were tested using Partial Least Squares Structural Equation Modeling (PLS-SEM) through SmartPLS 4, while SPSS was used for descriptive analysis. The findings reveal that GEO significantly enhances both GSCM practices and SCA, while GSCM also exerts a positive effect on SCA. Furthermore, the mediation analysis confirms that GSCM serves as a significant explanatory mechanism linking GEO with sustainable competitive outcomes. Among the tested relationships, the GEO → GSCM path emerged as the strongest, highlighting the strategic importance of entrepreneurial environmental orientation in shaping sustainable supply chain practices. This study contributes to the NRBV literature by empirically explaining how internal green entrepreneurial capabilities are transformed into sustainable competitive advantage through supply chain management processes in an emerging economy context. The findings also provide practical implications for textile firms seeking to strengthen competitiveness, improve environmental performance, and support sustainable industrial development through integrated green entrepreneurial and supply chain strategies.

Keywords: *Green Entrepreneurial Orientation, Green Supply Chain Management, Sustainable Competitive Advantage, Natural Resource-Based View*

INTRODUCTION

Environmental degradation and climate-related challenges have intensified global pressure on industries to adopt sustainable business practices. Issues such as climate change, carbon emissions, water pollution, and resource depletion have prompted governments, international organizations, and regulatory bodies to implement sustainability-oriented frameworks, including the Sustainable Development Goals (SDGs) and Environmental, Social, and Governance (ESG) standards (World Economic Forum, 2024; Sustainable Development Policy Institute, 2023). Among manufacturing industries, the textile sector is widely regarded as one of the most environmentally damaging due to excessive water use, chemical use, carbon emissions, and large-scale waste generation (UNEP, 2024). Consequently, sustainability has evolved from a voluntary initiative into a strategic requirement for long-term competitiveness and organizational legitimacy.

The growing environmental scrutiny of the textile industry is particularly significant in developing economies such as Pakistan, where textile production is a major export-oriented sector. Pakistani textile firms face increasing pressure from international buyers and global markets to

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comply with stringent environmental and sustainability standards (Kraus et al., 2020). In response, policymakers and development agencies have initiated sector-wide sustainability reforms aimed at improving ESG compliance, environmental efficiency, and international competitiveness (Kokeza et al., 2023). However, despite these initiatives, many firms continue to struggle to integrate sustainability into their strategic and operational practices.

In this context, green entrepreneurship has emerged as a key strategic approach for balancing environmental responsibility with economic performance. Prior studies suggest that green entrepreneurial initiatives promote eco-innovation, environmental performance, regulatory compliance, and sustainable competitiveness (Ahmad et al., 2022; Potluri & Phani, 2020). More specifically, Green Entrepreneurial Orientation (GEO) enables firms to embed environmental considerations into entrepreneurial decision-making, innovation activities, and market strategies (Mondal et al., 2024; Zhao et al., 2021). At the operational level, Green Supply Chain Management (GSCM) practices, such as green purchasing and customer cooperation, help organizations minimize environmental impacts while improving efficiency and sustainability outcomes (Acquah, 2024; Sahoo & Vijayvargy, 2021). Existing research further indicates that firms adopting environmentally oriented strategies and GSCM practices are more likely to achieve sustainable competitive advantage (SCA) through innovation capability, stakeholder trust, and improved environmental performance (Chan et al., 2012; Habib et al., 2023).

Despite the growing body of literature on sustainability, several important gaps remain. First, prior studies have predominantly examined Green Entrepreneurial Orientation and Green Supply Chain Management as separate constructs, with limited attention to their integrated relationship in explaining sustainable competitive advantage. Second, existing studies largely focus on developed economies or generalized manufacturing contexts, while evidence from emerging economies, particularly Pakistan's textile sector, remains scarce (Akhuand & Abbas, 2023; Luu, 2021). Third, the literature provides insufficient understanding of how specific dimensions of GEO, namely market orientation and environmental orientation, influence distinct GSCM practices such as green purchasing and customer cooperation. This limits theoretical clarity regarding the underlying mechanisms through which sustainability-oriented entrepreneurial capabilities translate into competitive outcomes.

Accordingly, this study addresses these gaps by developing and empirically testing an integrated framework grounded in the Natural Resource-Based View (NRBV) theory. Specifically, the study investigates:

1. The direct effects of GEO dimensions (market orientation and environmental orientation) on GSCM practices (green purchasing and customer cooperation)
2. The relationship between GSCM practices and sustainable competitive advantage
3. The mediating role of GSCM in the relationship between GEO and SCA.A.

This study contributes to literature in several ways. First, it advances sustainability and entrepreneurship research by integrating GEO dimensions and GSCM practices within a single mediation framework. Second, it extends the application of NRBV theory by explaining how sustainability-oriented entrepreneurial capabilities are transformed into competitive advantage through supply chain mechanisms. Third, by focusing on Pakistan's textile industry, the study provides context-specific evidence from an environmentally sensitive, export-dependent sector that remains underrepresented in the sustainability literature (Fraj et al., 2013; Hervani et al., 2005). Using data collected from 185 managers in textile firms, the study offers practical insights into how firms in emerging economies can strategically align entrepreneurship and supply chain sustainability to achieve long-term competitive advantage in increasingly sustainability-driven global markets.

LITERATURE REVIEW

The Natural Resource-Based View (NRBV) as a Theoretical Foundation

This study is grounded in the Natural Resource-Based View (NRBV), which extends the traditional resource-based view by emphasizing environmentally embedded capabilities as sources of long-term competitive advantage. According to NRBV, firms achieve sustainable competitive advantage (SCA) through strategic capabilities associated with pollution prevention, product stewardship, and sustainable development. These dimensions are particularly relevant in environmentally sensitive industries such as the textile sector, where ecological compliance, stakeholder pressure, and resource efficiency increasingly shape competitive positioning.

Within this framework, Green Entrepreneurial Orientation (GEO) represents a strategic capability that integrates market responsiveness and environmental commitment. Market Orientation (MO) reflects the firm's ability to identify and respond to evolving customer and market demands, whereas Environmental Orientation (EO) captures the organization's internal commitment to ecological responsibility and sustainability. Simultaneously, Green Supply Chain Management (GSCM) practices, particularly green purchasing and customer cooperation, operationalize these orientations by translating strategic intent into actionable environmental practices across the supply chain.

Although prior NRBV studies generally support the positive role of environmental capabilities in achieving competitive advantage, empirical evidence remains fragmented. Some studies report strong direct relationships between GEO-related orientations and sustainable performance outcomes, while others identify weaker or context-dependent effects due to institutional constraints, financial limitations, or inadequate supplier capabilities in emerging economies. This inconsistency suggests that environmental orientations alone may not automatically generate SCA unless they are effectively transformed into operational capabilities through supply chain mechanisms. Hence, the present study extends NRBV by conceptualizing GSCM as a dynamic and relational capability that mediates the transformation of entrepreneurial orientations into sustainable competitive outcomes.

Moreover, existing literature has predominantly examined GEO, GSCM, and SCA independently or through aggregated constructs, providing limited explanation of how specific dimensions of GEO differentially influence individual GSCM practices. By disaggregating GEO into MO and EO, and GSCM into green purchasing and customer cooperation, this study responds to calls for more nuanced and process-oriented investigations. The proposed framework therefore contributes theoretically by explaining not only whether GEO influences SCA, but also how and through which mechanisms these effects occur.

Another limitation in prior studies is the limited attention given to contextual moderators that may alter the strength of these relationships. Factors such as regulatory pressure, firm size, technological capability, organizational culture, and supplier environmental readiness may strengthen or weaken the effectiveness of GSCM initiatives. For instance, firms operating in export-oriented textile markets may experience stronger benefits from customer cooperation due to greater sustainability pressures from international buyers, whereas smaller firms with limited financial resources may struggle to implement green purchasing despite possessing strong environmental orientations. While these moderators are not directly tested in the present study, acknowledging them provides a more critical understanding of the GEO–GSCM–SCA nexus and identifies important directions for future research.

Green Entrepreneurial Orientation (GEO) and its Dimensions

The Influence of Market Orientation (MO) on GSCM

Existing literature suggests that market-oriented firms are more likely to adopt environmentally responsible supply chain practices because they actively monitor customer preferences, competitor actions, and regulatory expectations. Firms with strong MO capabilities are generally more responsive to rising market demand for sustainable products and environmentally responsible operations. Consequently, such firms tend to incorporate green criteria into supplier selection and to develop collaborative relationships with customers to enhance environmental performance.

Empirical studies by Habib et al. (2023) and Wilburn Green et al. found positive associations between MO and GSCM adoption. However, the magnitude of these relationships varies considerably across industries and institutional settings. In highly competitive and export-oriented markets, MO often exerts a stronger influence because customer sustainability expectations directly affect market access and brand reputation. Conversely, in developing economies where consumers remain price-sensitive and environmental awareness is comparatively lower, the effect of MO on green practices may be weaker or more symbolic than substantive.

Furthermore, previous studies have not sufficiently distinguished among different forms of GSCM practices. While market intelligence may strongly encourage customer cooperation due to direct interaction with environmentally conscious buyers, its influence on green purchasing may depend more heavily on supplier availability, procurement costs, and technological infrastructure. This indicates that MO may not influence all GSCM dimensions equally, thereby justifying separate examination of green purchasing and customer cooperation. Therefore, the study proposes:

H_1: Market Orientation (MO) positively influences Green Purchasing (GP).

H_2: Market Orientation (MO) positively influences Customer Cooperation (CC).

The Influence of Environmental Orientation (EO) on GSCM

Environmental Orientation (EO) reflects the extent to which firms integrate ecological concerns into strategic planning, organizational culture, and operational decision-making. Unlike MO, which is primarily externally driven, EO stems from internal environmental values and ethical commitments to sustainability. Firms with strong EO are more likely to prioritize environmentally responsible sourcing, waste reduction, and long-term ecological stewardship.

Prior research generally supports a positive relationship between EO and GSCM practices. Chan et al. (2012) and Sahoo and Vijayvargy (2021) argue that environmentally oriented organizations are more inclined to integrate green considerations into procurement and collaborative supply chain activities. Similarly, Kwabena Anin et al. (2023) and Andersén et al. (2020) identify EO as a major predictor of sustainable supplier relationships and environmentally collaborative partnerships.

Nevertheless, the literature also reports conflicting findings. Some studies conducted in emerging economies report that EO does not always translate into effective GSCM implementation due to financial constraints, weak environmental regulations, or limited access to environmentally certified suppliers. In such contexts, firms may express environmental commitment symbolically while lacking the operational capability to implement substantive green practices. These inconsistencies indicate that the EO–GSCM relationship may be contingent on contextual factors such as institutional support, managerial expertise, and supply chain readiness.

In addition, the strength of EO's influence may vary across GSCM dimensions. EO may exert a stronger effect on green purchasing because supplier selection decisions directly reflect internal environmental values, whereas customer cooperation may require external stakeholder alignment

and market-driven incentives. Such distinctions remain underexplored in the literature and warrant further empirical investigation. Accordingly, this study hypothesizes:

H_3: Environmental Orientation (EO) positively influences Green Purchasing (GP).

H_4: Environmental Orientation (EO) positively influences Customer Cooperation (CC).

The Direct Impact of GSCM on Sustainable Competitive Advantage (SCA)

Green Supply Chain Management practices are increasingly recognized as strategic capabilities that enhance long-term competitiveness. Green purchasing improves cost efficiency, regulatory compliance, risk reduction, and product quality through environmentally responsible sourcing decisions. Similarly, customer cooperation helps firms strengthen brand loyalty, drive environmental innovation, and build responsive, sustainability-driven relationships with key stakeholders.

Research by Foo (2021) found that GSCM practices positively influence financial, environmental, and reputational performance outcomes. However, prior studies also show that effect sizes vary with organizational and market conditions. For example, customer cooperation tends to yield stronger competitive benefits in industries where environmentally conscious consumers actively shape purchasing behavior, whereas green purchasing may deliver greater operational efficiencies in manufacturing-intensive sectors such as textiles.

Additionally, some scholars argue that the benefits of GSCM may not be immediate because green initiatives often require high upfront investment and longer implementation periods. Small and medium-sized firms may therefore experience delayed or weaker competitive gains compared with larger organizations that possess stronger technological and financial resources. These mixed findings highlight the need to examine not only whether GSCM contributes to SCA, but also which dimensions generate comparatively stronger strategic value. Thus, the study proposes:

H_5: Green Purchasing (GP) positively influences Sustainable Competitive Advantage (SCA).

H_6: Customer Cooperation (CC) positively influences Sustainable Competitive Advantage (SCA).

GSCM as a Mediating Mechanism

This study argues that the relationship between GEO and SCA is not merely direct; rather, it is substantially mediated by GSCM practices. Although prior studies have examined mediation effects in sustainability and innovation research, many have treated GEO and GSCM as aggregated constructs, limiting theoretical clarity about the specific mechanisms through which entrepreneurial orientations generate competitive outcomes.

Drawing on NRBV, strategic orientations alone cannot create sustainable advantage unless they are transformed into operational capabilities and relational practices. In this regard, green purchasing and customer cooperation serve as critical mediating mechanisms that convert strategic environmental intent into tangible organizational outcomes. This process-oriented perspective advances NRBV by emphasizing capability deployment rather than treating environmental resources as inherently valuable.

The present study further contributes by differentiating mediation effects across GEO dimensions. Market Orientation may encourage customer cooperation more strongly because market-responsive firms prioritize close collaboration with environmentally conscious customers to maintain legitimacy and market share. In contrast, Environmental Orientation may exert stronger indirect effects through green purchasing because internally driven environmental values are directly reflected in sustainable procurement decisions. Such differences in mediation strength have received limited empirical attention despite their important theoretical implications.

Prior mediation studies by Chen et al. (2015) and Borazon et al. (2022) partially support the

intermediary role of GSCM practices; however, evidence remains inconclusive regarding which dimensions produce stronger indirect effects and under what contextual conditions. Moreover, the possibility that organizational culture, technological capability, export intensity, or regulatory pressure moderate these mediation pathways has been largely overlooked in existing scholarship.

By addressing these gaps, the current study offers a more nuanced and integrated explanation of how GEO dimensions are translated into sustainable competitive advantage through distinct GSCM mechanisms within Pakistan's textile industry. Therefore, the following mediation hypotheses are proposed:

H_7: Green Purchasing (GP) mediates the relationship between Environmental Orientation (EO) and Sustainable Competitive Advantage (SCA).

H_8: Customer Cooperation (CC) mediates the relationship between Environmental Orientation (EO) and Sustainable Competitive Advantage (SCA).

H_9: Green Purchasing (GP) mediates the relationship between Market Orientation (MO) and Sustainable Competitive Advantage (SCA).

H_{10}: Customer Cooperation (CC) mediates the relationship between Market Orientation (MO) and Sustainable Competitive Advantage (SCA).

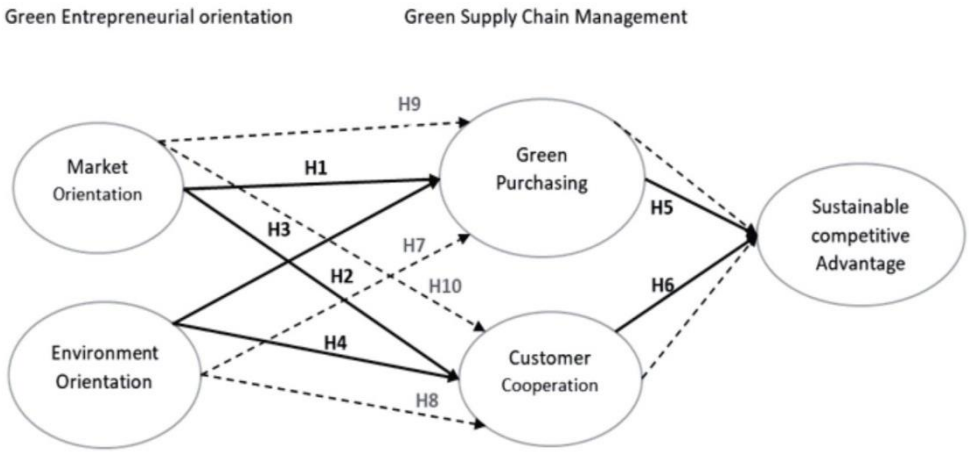

Figure 1: Theoretical framework

RESEARCH METHOD

Research Design and Measurement

This study used a quantitative, cross-sectional design to empirically examine the relationships among Green Entrepreneurial Orientation (GEO), Green Supply Chain Management (GSCM), and Sustainable Competitive Advantage (SCA). A structured questionnaire was used to collect primary data because quantitative surveys are appropriate for testing theoretically derived relationships among latent constructs in organizational research. The measurement scales were adapted from previously validated studies to ensure theoretical consistency, construct validity, and comparability with prior sustainability research (Acquah, 2024). All measurement items and their original sources are presented in Appendix A to enhance transparency and replicability.

Green Entrepreneurial Orientation was operationalized with two dimensions: Market Orientation (five items adapted from Baker and Sinkula, 1999) and Environmental Orientation (adapted from prior environmental strategy literature). GSCM was conceptualized with two operational dimensions, Green Purchasing and Customer Cooperation, using established multi-item scales commonly used in sustainability and supply chain research. Sustainable Competitive

Advantage was measured using adapted indicators that reflect long-term competitiveness, environmental differentiation, market positioning, and operational efficiency.

All constructs were operationalized as reflective latent variables measured on a five-point Likert scale from 1 ("strongly disagree") to 5 ("strongly agree"). The questionnaire was originally developed in English and then pre-tested with academic experts and industry practitioners to assess clarity, contextual relevance, and comprehensibility. Minor wording adjustments were made to reduce ambiguity and improve contextual suitability for Pakistan's textile sector.

Consistent with the Natural Resource-Based View (NRBV), GEO was treated as a strategic orientation that enables firms to deploy environmental capabilities through operational supply chain practices. Green purchasing and customer cooperation served as actionable GSCM mechanisms for translating strategic orientations into sustainable competitive outcomes. SCA indicators focused on long-term cost efficiency, environmental responsiveness, and market differentiation, which are central concerns in NRBV-based sustainability research (Aslam et al., 2023).

Sampling and Data Collection

The empirical context of the study was Pakistan's textile industry, which is one of the country's largest export-oriented sectors and also contributes substantially to industrial environmental challenges. The industry therefore provides an appropriate setting for examining sustainability-driven competitive strategies. Data collection was conducted between March and June 2024 using an online survey administered through Google Forms.

The survey link was distributed through professional networks, including LinkedIn, WhatsApp groups, and email contacts, targeting managerial employees working in textile firms located in Karachi, Lahore, Sialkot, and Multan. Respondents included managers involved in operational, procurement, environmental, and strategic decision-making functions because such individuals are more knowledgeable about organizational sustainability practices and supply chain initiatives.

Although the earlier version of the study described the sampling procedure as "stratified random sampling," the actual data collection process more closely reflected purposive and convenience-based sampling with proportional managerial representation. Specifically, respondents were approached through accessible professional and industrial networks rather than through a fully randomized sampling frame. However, efforts were made to achieve representation across different managerial levels, including frontline, middle, and top management employees, to obtain diverse organizational perspectives regarding sustainability practices and strategic implementation.

The sampling frame was informed by firms listed in textile industry associations and export directories, although the exact population size of eligible managerial employees was not available. Therefore, probability-based random selection could not be fully implemented. This clarification improves methodological transparency and aligns the sampling description more accurately with the actual data collection process.

A total of 200 responses were initially received, of which 185 questionnaires were retained after screening for missing values, response inconsistency, and incomplete entries, resulting in a usable response rate of 92.5%. The final sample size satisfies the recommended threshold for PLS-SEM analysis and is considered statistically adequate for models containing multiple latent constructs and mediation paths (Hair et al., 2014).

Because online surveys are vulnerable to non-response bias, several procedural measures were implemented to minimize this concern. Follow-up reminders were sent periodically to increase participation, and respondents were assured of anonymity and confidentiality to

encourage honest responses. Additionally, early and late responses were compared on key demographic and construct variables, and no substantial differences were observed, suggesting that non-response bias was unlikely to significantly affect the findings. Nevertheless, the possibility of some degree of non-response bias cannot be entirely excluded, particularly given the voluntary nature of participation and the reliance on professional networks.

The cross-sectional nature of the study also limits causal interpretation because all variables were measured at a single point in time. Therefore, while the findings support theoretically hypothesized relationships, they should not be interpreted as definitive evidence of causality.

Respondent Characteristics

The respondent profile reflects the managerial structure of Pakistan's textile sector. The majority of respondents were male (89.2%), while female respondents represented 10.8% of the sample. Most respondents were in the 36–45-year age category (78.9%), indicating substantial managerial and professional experience relevant to sustainability-related decision-making.

Educational attainment was relatively high, with 73.0% holding bachelor's degrees and 24.9% holding master's degrees, suggesting that respondents were adequately informed about organizational strategy and sustainability practices. Middle-level managers represented the largest group (80.0%), followed by frontline managers (15.1%) and top-level managers (4.9%), thereby ensuring representation from different organizational hierarchies.

Most respondents worked in large firms with more than 300 employees (82.7%), and a similarly large proportion represented firms that had been operating for more than 8 years (82.7%). These characteristics indicate that the sampled organizations generally possessed relatively mature operational and supply chain systems, making them suitable contexts for investigating GSCM implementation and sustainability-oriented competitive strategies.

Table 1: Demographic profile of respondents

Category	Frequency	Percentage
Gender		
Male	165	89.18
Female	20	10.81
Age		
25-35	27	14.6
36-45	146	78.9
46-55	10	5.4
More than 55	2	1.1
Education level		
Intermediate	2	1.1
Graduate	135	73.0
Masters	46	24.9
PHD	1	.5
Others	1	.5
Position Level		
Frontline managers	28	15.1
Middle managers	148	80
Top managers	9	4.9
Enterprise Scale		
1-10 people	3	1.6
11-50 people	7	3.8
51-100 people	10	5.4
101-300 people	12	6.5

More than 300 people	153	82.7
Established Years		
1 year or less	7	3.8
1-3 years	8	4.3
3-5 years	7	3.8
5-8 years	10	5.4
More than 8 years	153	82.7

This chapter reports on the empirical analysis conducted in SPSS for descriptive statistics and in PLS-SEM (Smart PLS 4) for hypothesis testing. This two-fold methodology allows for an initial examination of the sample data and a detailed analysis of causal relationships among variables in the conceptual framework. PLS-SEM was selected for its applicability to explanatory studies with many latent constructs and predictors, and because the sample of 185 observations provides sufficient statistical power for the model. PLS-SEM has been validated for moderate sample sizes when model complexity is considered and is typically applied in sustainability and supply chain analysis.

(Hair et al., 2014) note both the usefulness of PLS-SEM in complex models containing latent constructs, particularly for testing hypothesized relationships in abstract research models with smaller sample sizes, and its predictive performance. According to Cetin & Knouch (2018), PLS-SEM does not presuppose multivariate normality, can estimate numerous relationships between dependent and independent variables, and reduces the effects of multicollinearity. Since the study was cross-sectional and relied on self-reported data, a possible methodological issue was common method bias (CMB). In response, procedural solutions included providing anonymity to respondents, careful wording items, and spacing variables. The Harman single-factor test showed that no single factor explained most of the variance, so CMB was not a significant threat. The significance of the direct and indirect effects was established through a bootstrapping procedure that included 5000 resamples, which supported the validity and reliability of the empirical findings.

Descriptive Analysis of Respondents

To verify the sample's suitability for green entrepreneurial orientation, GSCM, and SCA, SPSS descriptive analysis profiled the respondents. Table 1 summarizes the demographic profile, which includes gender, age, education, position, enterprise scale, and year of establishment. The sample consisted mostly of males (89.18%). The majority (78.9) of respondents were aged 36-45, implying a reasonable level of professional and managerial experience that could be useful in strategic analysis. The level of education (73% graduate, 25% master) shows that the respondents were well versed in organizational strategies and sustainability. Most of them (80 percent) were in middle management, playing an important role in GSCM implementation and the translation of strategic orientations into operational behaviors. A large percentage were in large companies (more than 300 employees, 82.7) and in organizations that had been in existence for more than eight years (82.7%), which ensured that empirical data was gathered in mature organizations with well-developed supply chain frameworks (Chan et al., 2012).

Results from the Measurement Model

The PLS-SEM test entailed the measurement model analysis that analyzed the connection between the latent constructs and the observed variables by performing reliability and validity tests. The reflective measurement model was reviewed on indicator loadings, internal consistency reliability, convergent and discriminant validities, according to (Hair et al., 2019). The first measure of indicator reliability was through factor loadings. Loadings of 0.708 or greater represent that a construct measures more than half of the variance in an indicator. Table 2 indicates that all loading of the items were above this value, which proves the acceptable reliability of the item and the closeness of the relationship between the indicators and the corresponding constructs. (Foo, 2021).

Cronbach's alpha (a) and composite reliability (CR) were used to assess internal consistency. CR is preferred over SEM because it accounts for varying indicator loadings (Koberg and Longoni, 2019). A CR of 0.50 is considered satisfactory, whereas values above 0.70 are very trustworthy. According to Table 2, the CR values for GSCM customer cooperation (0.815), GSCM purchasing

(0.866), green entrepreneurial environmental orientation (0.909), green entrepreneurial marketing orientation (0.875), and sustainable competitive advantage (0.855) all exceed the recommended 0.8, indicating high internal consistency. All Cronbach's alpha values ranged from 0.794 to 0.903, which is above the suggested 0.60 for early-stage research, further confirming satisfactory internal reliability across all constructs (Sampaio et al., 2019).

Convergent validity was assessed using the Average Variance Extracted (AVE), which indicates the proportion of variance in the indicators explained by the construct. The AVE should be at least 0.50 (Mondal et al., 2024). Table 2 shows that all constructs satisfy this criterion, with AVE values ranging from 0.598 to 0.712, indicating that the indicators converge well to measure each construct.

Table 2. Items loading reliability and validity

Constructs	Code	Loadings	α	CR	AVE
GSCM (Customer Cooperation)	GSCCC1	0.837	0.794	0.815	0.617
	GSCCC2	0.740			
	GSCCC3	0.819			
	GSCCC4	0.739			
GSCM (Purchasing)	GSCP1	0.833	0.865	0.866	0.712
	GSCP2	0.854			
	GSCP3	0.849			
	GSCP4	0.840			
Green Entr Environmental Orientation (GEEO)	GEEO1	0.752	0.903	0.909	0.598
	GEEO2	0.705			
	GEEO3	0.811			
	GEEO4	0.675			
	GEEO5	0.797			
	GEEO6	0.835			
	GEEO7	0.815			
	GEEO8	0.783			
Green Entr Marketing Orientation (GEM)	GEM1	0.832	0.873	0.875	0.664
	GEM2	0.775			
	GEM3	0.840			
	GEM4	0.836			
	GEM5	0.789			
Sustainable Competitive Advantage (SCA)	SCA1	0.874	0.852	0.855	0.694
	SCA2	0.830			
	SCA3	0.859			
	SCA4	0.763			

Once reliability and convergent validity were verified, discriminant validity was assessed for the constructs to ensure they were empirically distinct. This was evaluated using the Fornell-Larcker criterion (Larcker, 1981), which requires that the square root of each construct's AVE be greater than the maximum correlation with any other construct. As shown in Table 3, the diagonal values (square roots of AVE) are larger than the inter-construct correlations, indicating adequate discriminant validity.

Table 3. Discriminant Validity

Constructs	GSCM customer Cooperation	GSCM purchasing	Green Entr Environmental Orientation	Green Entr Marketing Orient	Sustainable Competitive Advantage
GSCM customer Cooperation	0.785				
GSCM purchasing	0.616	0.844			

Environmental Orientation	0.758	0.671	0.773		
Marketing Orient	0.677	0.823	0.755	0.815	
Sustainable Competitive Advantage	0.624	0.795	0.725	0.794	0.833

Results from the Structural Model

Having the validation of the measurement model, the structural model was tested in order to investigate the causal relations between green entrepreneurial orientation, green supply chain management practices, and sustainable competitive advantage. This test is important to determine the predictive validity and explanatory power of the theoretical construct. The structural model was evaluated based on the collinearity test of predictor constructs, coefficient of determination (R2) of endogenous variables and statistical significance of structural path coefficients by bootstrapping following (Hair et al., 2017; Ringle et al., 2023).

The first step was the collinearity analysis to make sure that path coefficient analysis was not skewed by strong correlations of predictor variables. Multicollinearity was determined by the Variance Inflation Factor (VIF), and a factor of below 3 (preferably near 1) said that Multicollinearity was not a problem (Hair et al., 2017). All constructs in Table 4 have a VIF ranging between 1.610 and 2.326, all way under the critical value. This confirms that there is no poor Multicollinearity that may undermine the independent explanatory power of the green entrepreneurial marketing orientation and environmental orientation on green supply chain practices and SCA, which bolsters the effectiveness of the structural model (Anabaraonye et al., 2019).

Table 4. Collinearity statistics

Constructs	GSCM customer Cooperation	GSCM purchasing	Green Entr Environmental Orientation	Green Entr Marketing Orient	Sustainable Competitive Advantage
GSCM customer Cooperation					1.610
GSCM purchasing					1.610
Environmental Orientation	2.326	2.326			
Marketing Orient	2.326	2.326			
Sustainable Competitive Advantage					

Once collinearity issues were eliminated, the coefficient of determination (R2) was used to estimate the model's explanatory power, defined as the percentage of variance in the endogenous construct explained by the exogenous variables. R2 values of 0.25, 0.50, and 0.75 are considered weak, moderate, and strong, respectively (Hair et al., 2017). Table 5 shows that the R2 for GSCM customer cooperation is 0.600, indicating that green orientation accounts for 60% of its variance. The R2 for GSCM purchasing is 0.683, indicating high explanatory power. The R2 for sustainable competitive advantage is 0.661, indicating that green supply chain practices account for more than two-thirds of its variance. These findings indicate a high level of predictive power and demonstrate that GSCM practices driven by green entrepreneurial orientation are a significant contributor to

SCA (Qader et al., 2022). The strong R2 values also suggest that the model captures the main strategic and operational processes that provide sustainability-based competitiveness (Peterson, 2023).

Table 5. Coefficient of Determination

Constructs	R-square	R-square adjusted
GSCM customer Cooperation	0.600	0.596
GSCM purchasing	0.683	0.680
Sustainable Competitive Advantage	0.661	0.657

Hypothesis Testing

After determining the model's quality, ten hypotheses (six direct and four mediation) were tested using a bootstrapping technique with 5,000 resamples, a non-parametric resampling method applicable in PLS-SEM. Hypotheses that were statistically supported had t-values greater than 1.96 and p-values less than 0.05 (Hair et al., 2017; Asad, 2023).

Direct Effects

Direct effects are presented in Table 6. Green entrepreneurial marketing orientation has a significant and positive impact on GSCM purchasing (b = 0.737, t = 10.833, p = 0.001), supporting H1. This indicates that market-oriented green entrepreneurial companies are more likely to incorporate environmental considerations into purchasing decisions. This close connection underscores the effectiveness of market responsiveness in green supply chain programs. Marketing orientation also has a positive effect on GSCM customer cooperation (b = 0.242, t = 3.257, p = 0.001), confirming H2. This implies that market-oriented firms involve customers in sustainability programs. Overall, marketing orientation is vital to upstream and downstream green supply chain practices.

By contrast, the influence of environmental orientation on GSCM purchasing was not strong (b = 0.114, t = 1.508, p = 0.13), so H3 was rejected. This suggests that internal environmental orientation may not stimulate green purchasing without facilitating market structures, supplier willingness, and institutional support in emerging economies. Environmental values may not be directly translated into green purchasing decisions, given cost, supply, and operational constraints. Nonetheless, environmental orientation has a positive and significant effect on GSCM customer cooperation (b = 0.576, t = 7.470, p = 0.001), supporting H4. This indicates that environmentally oriented firms are effective at engaging customers in sustainability, aligning with corporate environmental values.

Moreover, the two aspects of GSCM play a major role in SCA. The impact of GSCM purchasing on SCA is positive (b = 0.661, t = 9.864, p < 0.001), substantiating H5. GSCM customer cooperation also has a positive influence on SCA (b = 0.217, t = 3.418, p = 0.001), supporting H6, though the effect is smaller, suggesting it is less important than green purchasing.

Table 6. Direct effects

H	Path coefficients	Beta	Sample mean (M)	Standard deviation (STDEV)	T statistics	P values	Decision
H_1	Marketing Orient → GSCM purchasing	0.737	0.738	0.068	10.833	0.000	S

H_2	Marketing Orient → GSCM customer Cooperation	0.242	0.241	0.074	3.257	0.001	S
H_3	Environmental Orientation → GSCM purchasing	0.114	0.113	0.076	1.508	0.13	NS
H_4	Environmental Orientation → GSCM customer Cooperation	0.576	0.580	0.077	7.470	0.000	S
H_5	GSCM purchasing → Sustainable Competitive Advantage	0.661	0.662	0.067	9.864	0.000	S
H_6	GSCM customer Cooperation → Sustainable Competitive Advantage	0.217	0.216	0.064	3.418	0.001	S

Mediation Effects

In addition to direct effects, the research examined the mediating role of GSCM purchasing and customer cooperation in the relationship between green entrepreneurial orientation and SCA. Mediation analysis offers another opportunity to understand the impact of strategic orientations on performance outcomes in a more nuanced way. The mediation results are presented in Table 7. The relationship between environmental orientation and SCA does not go through GSCM purchasing (H7), and the indirect effect is not significant (b = 0.075, t = 1.462, p = 0.144). This supports the previous finding that environmental values are not a direct influence on procurement decisions aimed at creating competitive advantage.

However, customer cooperation within GSCM plays a major role in mediating the association between environmental orientation and SCA (H8, t = 2.846, p = 0.004). This underscores customer cooperation as an essential way environmentally oriented companies can operationalize their values into competitive advantages. GSCM purchasing (H9) and customer cooperation (H10) are both found to play a significant mediating role between marketing orientation and SCA, confirming that market-oriented green entrepreneurship, through an effective use of the green supply chain, enhances competitiveness.

Table 7. Mediation effects

H	Path Coefficients	Beta	Sample mean (M)	Standard deviation (STDEV)	T statistics	P values	Decision
H_7	Environmental Orientation → GSCM purchasing → Sustainable Competitive Advantage	0.075	0.075	0.052	1.462	0.144	NS
H_8	Environmental Orientation → GSCcustomer Cooperation →	0.125	0.126	0.044	2.846	0.004	S

	Sustainable Competitive Advantage						
H_9	Marketing Orient → GSCM purchasing → Sustainable Competitive Advantage	0.487	0.489	0.069	7.038	0.000	S
H_{10}	MarketingOrient → GSCM customer Cooperation → Sustainable Competitive Advantage	0.053	0.051	0.021	2.446	0.014	S

In general, the finding of the structural model generally supports the theoretical framework in an empirical manner. One of the leading motivators of green supply chain practices is marketing orientation, which would affect purchasing and customer collaboration. The role of environmental orientation is a selective phenomenon that does not contribute to the improvement of purchasing decisions to a significant extent but severely affects the customers (Meuer et al., 2020; Du and Wang, 2022). Customer cooperation does not have a direct effect on SCA as compared to green purchasing. Moreover, green supply chain practices partially mediate the relationship between green entrepreneurial orientation and SCA, which proves it to be the factor of the transformation of strategic intent into long-term competitive advantage. The visual representation of the confirmed relationships and strengths of the structural relationships is presented in Figure 2.

This chapter presents the empirical analysis conducted using SPSS for descriptive statistics and SmartPLS 4 for Partial Least Squares Structural Equation Modeling (PLS-SEM). PLS-SEM was selected because of its suitability for predictive and exploratory research involving multiple latent constructs, mediation relationships, and moderate sample sizes. It is particularly appropriate in sustainability and supply chain research contexts where theoretical development remains evolving and data normality assumptions may not always be satisfied (Hair et al., 2014).

PLS-SEM allows simultaneous estimation of measurement and structural models and is robust when dealing with complex causal relationships among constructs (Cetin & Knouch, 2018). The approach also accommodates non-normal data distributions and minimizes multicollinearity concerns among predictor variables.

Given that the study relied on cross-sectional self-reported survey data, common method bias (CMB) represented a potential methodological concern. To reduce this risk, procedural remedies were implemented, including respondent anonymity, careful questionnaire wording, and psychological separation of predictor and criterion variables. Furthermore, Harman's single-factor test indicated that no single factor accounted for the majority of variance, suggesting that common method bias was not a severe threat to the validity of the findings.

The statistical significance of direct and indirect relationships was assessed using a bootstrapping procedure with 5,000 resamples, which enhances the robustness and reliability of mediation and path coefficient estimates within PLS-SEM analysis.

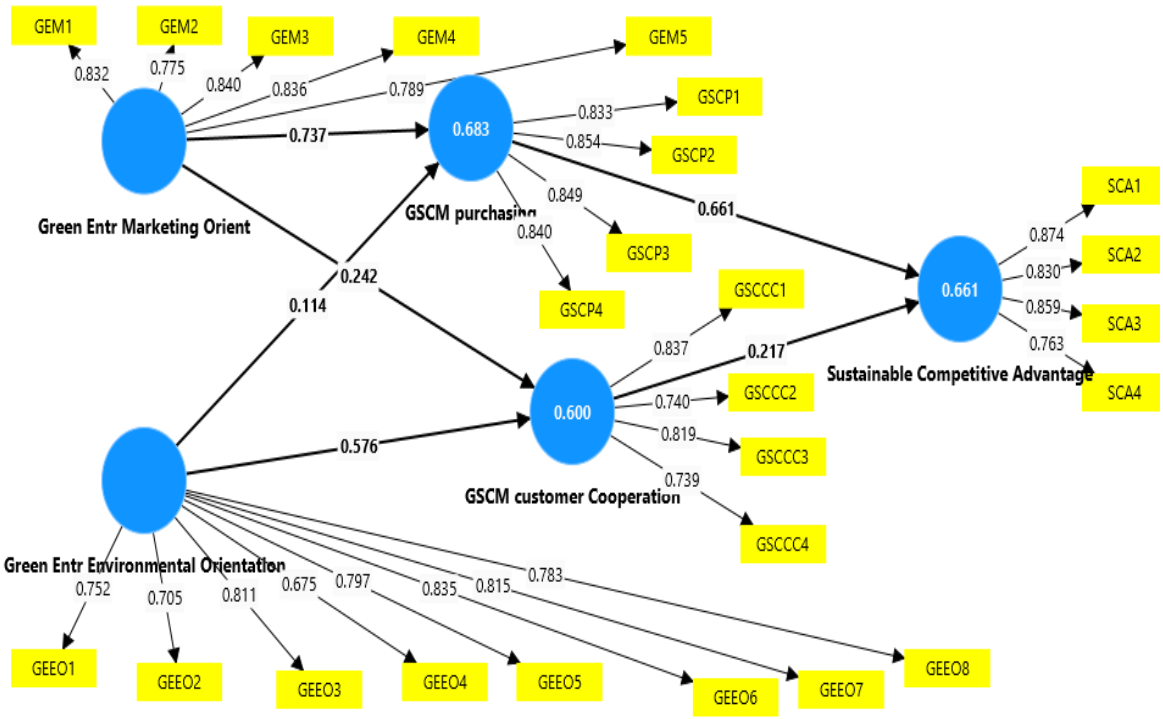

Figure 2. Measurement Model (Theoretical Framework with path coefficients)

FINDINGS AND DISCUSSION

The findings of this study contribute to the growing body of literature on the relationship among Green Entrepreneurial Orientation (GEO), Green Supply Chain Management (GSCM), and Sustainable Competitive Advantage (SCA) in emerging economies. Consistent with the Natural Resource-Based View (NRBV), the results demonstrate that sustainability-oriented entrepreneurial capabilities do not automatically translate into competitive advantage unless they are operationalized through concrete supply chain practices. In this regard, green purchasing and customer cooperation function as strategic mechanisms through which environmental and market-oriented capabilities are transformed into long-term organizational value.

The findings support prior studies by Sarkis (2003) and Wagner et al., (2014) which argued that environmental capabilities become strategically valuable only when embedded into operational processes. However, the present study extends these earlier findings by empirically distinguishing among GEO dimensions and GSCM practices. Unlike prior studies that treated green entrepreneurship as a unified construct, this study demonstrates that market orientation and environmental orientation influence sustainability outcomes through different operational pathways. This distinction provides a more process-oriented interpretation of NRBV within the context of developing economies.

Another important theoretical contribution is the study's emphasis on sustainability as a dynamic, operational capability rather than merely an organizational value or a symbolic orientation. Previous research often assumed that firms possessing environmental commitment would naturally implement green operational practices. However, the present findings suggest that the translation of environmental intent into operational outcomes is conditional and uneven. This perspective aligns with the dynamic capability arguments advanced by Golsefid-alavi et al., (2021) which emphasize that competitive environmental capabilities evolve through continuous organizational learning and operational integration rather than through isolated strategic intentions.

One of the strongest empirical findings concerns the role of Market Orientation (MO) in

promoting GSCM practices. MO demonstrated a particularly strong influence on green purchasing and a significant positive effect on customer cooperation. These findings are highly consistent with the work of Habib et al. (2023) and Borazon et al., (2022) both of which reported that firms responding to customer sustainability expectations are more likely to adopt environmentally responsible supply chain practices.

However, the current study identifies stronger effects than some previous studies conducted in less export-oriented industries. This difference may be explained by the context of Pakistan's textile sector, where international buyers impose substantial sustainability and compliance pressures on exporting firms. Consequently, market responsiveness becomes not only a competitive strategy but also a requirement for maintaining access to global supply chains. This contextual explanation helps explain why MO had a stronger predictive effect on green purchasing than customer cooperation. Procurement-related sustainability initiatives often generate more immediate operational and compliance benefits, particularly in export-driven manufacturing industries where supplier certification and environmental compliance are critical.

In contrast, Environmental Orientation (EO) produced a more differentiated pattern of effects. While EO significantly influenced customer cooperation, its effect on green purchasing was statistically insignificant. This finding contrasts with studies such as Makhloufi et al., (2021) which reported uniformly positive relationships between environmental orientation and green supply chain practices. The inconsistency suggests that environmental commitment alone may not be sufficient to drive sustainable procurement decisions in emerging economies characterized by institutional constraints, limited supplier readiness, and cost pressures.

The findings instead align more closely with Zhao et al. (2021) and Shaikh et al., (2023) who argued that upstream green procurement is highly dependent upon external market infrastructure and supplier ecosystem maturity. In Pakistan's textile industry, environmentally committed firms may still face difficulties identifying affordable, environmentally certified suppliers or implementing sustainable procurement due to financial and operational limitations. Consequently, EO appears more capable of influencing downstream relational activities, such as customer engagement and sustainability communication, than of influencing upstream procurement behavior.

This finding is theoretically significant because it identifies an important boundary condition within NRBV applications in developing economies. Specifically, the results suggest that internal environmental values require supportive institutional and market conditions to effectively generate operational sustainability outcomes. The study, therefore, advances NRBV by highlighting the importance of contextual and institutional constraints in shaping the effectiveness of environmental capabilities.

The study further demonstrates that GSCM practices serve as important drivers of Sustainable Competitive Advantage. Both green purchasing and customer cooperation positively influenced SCA, although green purchasing exerted a substantially stronger effect. This result supports prior empirical findings by Meuer et al., (2020) and Afum and Issau (2023), which identified GSCM practices as important sources of operational efficiency, reputational enhancement, and long-term competitiveness.

Nevertheless, the current study provides more nuanced evidence regarding the relative strength of different GSCM dimensions. Green purchasing generated stronger effects on SCA because procurement-related sustainability initiatives directly influence cost reduction, resource efficiency, operational reliability, and compliance performance. These outcomes are often measurable and financially observable in manufacturing industries. By comparison, customer cooperation contributes more indirectly through reputation-building, customer trust, and collaborative innovation, which may take longer to translate into measurable competitive gains.

This differentiation is particularly relevant in emerging-economy contexts, where firms often prioritize sustainability initiatives that yield immediate operational returns due to resource limitations and competitive pressures. The findings therefore support the argument that sustainability-based competitive advantage is multidimensional and derived through both operational efficiency and relational value creation.

Mediation analysis further strengthens the study's theoretical contribution. The results reveal that GSCM practices partially mediate the relationship between GEO dimensions and SCA, confirming that entrepreneurial orientations require operational mechanisms to produce competitive outcomes. Specifically, green purchasing significantly mediated the relationship between Market Orientation and SCA but failed to mediate the EO–SCA relationship. Conversely, customer cooperation significantly mediated the relationships between Market Orientation, Environmental Orientation, and SCA.

These findings provide more explicit support for Ageron et al.'s (2012) argument that different sustainability orientations use distinct operational channels to achieve competitive outcomes. The results also complement the findings of Du and Wang (2022), which emphasized the strategic importance of relational supply chain collaboration in transforming environmental commitment into organizational performance.

Unlike many previous studies that conceptualized green entrepreneurship as a homogeneous construct, the present study demonstrates that entrepreneurial orientations generate competitive outcomes through differentiated sustainability pathways. This represents important theoretical advancement because it explains why some sustainability initiatives yield stronger operational outcomes, whereas others primarily generate relational or reputational benefits.

Overall, the findings suggest that sustainable competitive advantage in emerging economies is most effectively achieved when market-responsive sustainability strategies are integrated with practical, operational supply chain implementation mechanisms. The study therefore refines the NRBV perspective by emphasizing that sustainability-driven competitive advantage is selective, context-dependent, and operationally embedded rather than universally automatic. Future research may extend this perspective by examining how moderating factors such as institutional quality, regulatory pressure, supplier environmental capability, technological readiness, and organizational culture influence the strength of these differentiated sustainability pathways across industries and countries.

CONCLUSIONS

This study concludes that sustainable competitive advantage is not generated merely by the presence of environmental or market-oriented strategic intentions, but by their effective translation into operational green supply chain practices. Drawing on the Natural Resource-Based View (NRBV), the findings demonstrate that Green Supply Chain Management serves as an important capability mechanism through which Green Entrepreneurial Orientation contributes to long-term competitiveness.

The empirical findings reveal that Market Orientation plays a significant role in promoting both green purchasing and customer cooperation, suggesting that firms that respond proactively to customer expectations and market sustainability pressures are more likely to embed environmental practices in their supply chain operations. Environmental Orientation, however, had a more selective influence, significantly strengthening customer cooperation while showing no significant effect on green purchasing. This finding highlights that internal environmental commitment alone may not be sufficient to drive upstream procurement transformation in emerging economies characterized by institutional and supplier-related constraints.

Among the examined GSCM practices, green purchasing had the strongest influence on Sustainable Competitive Advantage, indicating that upstream sustainability initiatives substantially contribute to operational efficiency, resource optimization, compliance capability, and long-term strategic positioning. Customer cooperation also positively influenced competitive advantage, though its effect was comparatively weaker, reflecting the more gradual and relational nature of downstream sustainability benefits such as trust, reputation, and collaborative innovation.

The study contributes theoretically by extending NRBV through a process-oriented explanation of how entrepreneurial sustainability orientations are operationalized via differentiated supply chain mechanisms. Unlike earlier studies that treated green entrepreneurship as a homogeneous capability, the present research demonstrates that distinct entrepreneurial orientations yield competitive outcomes through different sustainability pathways. This nuanced perspective deepens understanding of sustainability capability formation in developing-economy contexts.

From a managerial perspective, the findings suggest that firms should move beyond symbolic sustainability commitments and integrate sustainability into operational supply chain activities. In particular, strengthening environmentally responsive procurement systems and collaborative stakeholder relationships may enhance firms' ability to generate enduring competitive benefits. The results also imply that market-driven sustainability pressures, especially in export-oriented industries such as textiles, can serve as important catalysts for organizational environmental transformation.

At the policy level, the findings underscore the importance of institutional support mechanisms that facilitate supplier environmental readiness, sustainability capability development, and industry-wide collaboration. In emerging economies, environmental orientations may fail to yield meaningful operational outcomes unless supported by stronger regulatory frameworks, technological infrastructure, and accessible sustainability standards across supply chain networks.

Despite these contributions, the study has several limitations. First, the cross-sectional design limits the ability to establish definitive causal relationships among the constructs. Second, the use of self-reported survey data may introduce perceptual bias despite procedural efforts to reduce common method variance. Third, the study focused exclusively on Pakistan's textile industry, which may limit the generalizability of the findings to other industrial or national contexts.

Future research may address these limitations by employing longitudinal designs, multi-industry comparisons, and multi-source datasets to strengthen causal interpretation and external validity. Further investigation of moderating variables such as regulatory pressure, supplier capability, organizational culture, technological readiness, and institutional quality may also provide deeper insight into the contextual conditions shaping sustainability-oriented competitive advantage.

LIMITATION & FURTHER RESEARCH

The primary limitations of this study stem from its cross-sectional design and reliance on self-reported data, which restrict the ability to infer direct causal relationships and introduce the potential for common method bias. Additionally, the research's focus solely on the Pakistani textile industry, while providing valuable context-specific insights, limits the generalizability of its findings to other sectors or diverse economic environments. These methodological choices, although often practical, mean that the identified associations between variables cannot be definitively interpreted as cause-and-effect, and the observed relationships might not hold universally.

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