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How Green Organizational Culture Influences Green Entrepreneurial Orientation and Green Innovation in Small and Medium Sized Enterprises

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ABSTRACT

This study paper analyzes the effect of Green Organizational Culture (OGC) on Green Entrepreneurial Orientation (GEO) and Green Innovation (GI), as well as their combined influence on Green Performance (GP) in Small and Medium Enterprises (SMEs). The urgent challenges of climate change, environmental deterioration, and heightened consumer consciousness regarding sustainability have compelled companies to reevaluate conventional business structures. Although major firms possess the capacity to tackle these difficulties, SMEs encounter structural limitations; still, their impact on economies and communities renders their green transformation imperative. This study employed a quantitative research design to gather data from 230 SMEs in Multan, Pakistan, a region contending with environmental degradation, including deforestation, industrial pollution, and unsustainable farming practices. OGC, GEO, GI, and GP constructs were assessed utilizing validated scales, and the data were analyzed through Partial Least Squares Structural Equation Modeling (PLS-SEM). Results indicated that OGC substantially influences GEO and GI, whereas GEO subsequently propels GI. Consequently, GI directly improves GP across environmental, social, and economic dimensions. The findings substantiate the Resource-Based View (RBV) hypothesis, emphasizing intangible resources—such as cultural alignment and entrepreneurial proactivity—as essential assets for enduring competitive advantage. The paper offers theoretical insights by situating the dynamics of OGC, GEO, and GI inside South Asian SMEs, where empirical information is scarce. Recommendations entail enhancing leadership dedication to sustainability, offering training and incentives for environmentally conscious entrepreneurship, and integrating eco-innovation into strategic planning. Ultimately, SMEs that foster robust green cultures and entrepreneurial orientations are more adept at sustainable innovation, attaining superior performance, and making significant contributions to global sustainability objectives.

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Introduction

The 21st century is marked by unparalleled environmental difficulties. Escalating global temperatures, loss of biodiversity, depletion of natural resources, and ecological imbalance have compelled governments, communities, and organizations to recognize that conventional practices are no longer sustainable. The Sustainable Development Goals (SDGs) underscore the necessity of aligning current economic growth with the welfare of future generations. Organizations play a vital role in this shift, as their operations substantially impact environmental sustainability.

Small and medium-sized enterprises constitute the foundation of the majority of global economies. In Pakistan, they constitute over 90% of firms, contribute more than 40% to GDP, and employ about 80% of the non-agricultural workforce. Notwithstanding their economic importance, SMEs frequently function under limitations like restricted access to capital, insufficient technical proficiency, and heightened susceptibility to environmental disturbances. Their green makeover is not only important but also urgent, given their significant ecological footprint.

The Significance of Organizational Green Culture

Organizational culture influences corporate behavior, decision-making processes, and stakeholder engagement. When culture incorporates environmental ideals, it transforms into an Organizational Green Culture (OGC). OGC guarantees the integration of sustainability into its strategic vision, daily operations, and employee perspectives. Organizations with robust organizational governance and compliance are more inclined to adhere to environmental regulations, seek sustainable innovations, and attain enduring legitimacy within society.

The Significance of Green Entrepreneurial Orientation

Entrepreneurial Orientation (EO) has consistently been associated with business performance due to its focus on innovativeness, proactivity, and risk-taking. When environmental responsibility is included into Entrepreneurial Orientation (EO), it transforms into Green Entrepreneurial Orientation (GEO). GEO encourages companies to foresee regulatory modifications, innovate within environmentally sustainable markets, and transform sustainability concerns into entrepreneurial ventures.

Eco-Innovation and Performance

Green Innovation (GI) signifies the concrete results of OGC and GEO. It include creating sustainable products, implementing clean manufacturing methods, and offering services that reduce environmental effect. Green Infrastructure (GI) improves environmental results as well as economic and social performance by minimizing waste, enhancing efficiency, and fortifying stakeholder relationships.

Literature Review

Organizational Green Culture (OGC)

OGC embodies the shared convictions, standards, and practices that emphasize environmental principles. Harris and Crane (2002) assert that business culture is essential in influencing employees' environmental awareness and dedication. Organizations with robust organizational green culture promote eco-conscious behaviors among employees, conform to cultural norms, and integrate sustainability into their long-term objectives.

Green Entrepreneurial Orientation (GEO)

Kuckertz and Wagner (2010) contend that a sustainability perspective, when integrated with entrepreneurship, augments enterprises' capacity to recognize opportunities in environmentally

friendly marketplaces. GEO facilitates anticipatory actions about environmental alterations, transforming obstacles into prospects. Companies with robust Global Environmental Orientation (GEO) frequently experience enhanced brand reputation, increased stakeholder trust, and heightened competitiveness (Chang & Chen, 2013).

Green Innovation (GI)

Fussler and James (1996) characterized eco-innovation as inventions that incorporate environmental considerations into design and processes. GI is progressively acknowledged as a catalyst for competitive advantage. Small and medium-sized enterprises participating in green initiatives see improved efficiency, adherence to regulations, and increased client satisfaction (Asadi et al., 2020).

Green Performance (GP)

GP comprises three dimensions:

1. Environmental Performance (ENP): Mitigation of emissions, waste, and resource utilization.
2. Social Performance (SP): Enhanced community relations, workplace health and safety, and stakeholder participation.
3. Economic Performance (EP): Enhanced profitability, market share, and efficiency via sustainable practices.

Small and Medium Enterprises and Sustainability Challenges

Small and medium-sized enterprises frequently lack the financial resources, expertise, and infrastructure necessary to implement comprehensive green plans. Nonetheless, their adaptability and closeness to communities present distinct opportunities for incorporating sustainability into operations (Jun et al., 2019).

Theoretical Framework: Resource-Based View (RBV)

The Resource-Based View (RBV) paradigm posits that organizations attain enduring competitive advantage via resources that are valued, uncommon, and inimitable (Wernerfelt, 1984). OGC and GEO are intangible assets that, when integrated, enhance GI and elevate GP. This framework supports the hypotheses examined in this study.

Problem Statement

Pakistan's SMEs encounter significant environmental challenges, including deforestation, unsustainable agriculture methods, and industrial pollution. In Multan, the removal of more than 100,000 mango trees for real estate development exemplifies the conflict between immediate economic benefit and enduring ecological stability. This prompts urgent inquiries:

Research Questions

1. What is the impact of OGC on GEO and GI in SMEs?
2. What is the function of GEO in promoting GI?
3. In what manner do these aspects collectively enhance Green Performance (GP)?

Objectives

The research aims to achieve the subsequent objectives:

1. To assess the influence of OGC on GEO and GI.
2. To evaluate the influence of GEO on promoting GI.
3. To assess the impact of GI on GP across environmental, social, and economic dimensions.
4. To contextualize these linkages inside small and medium enterprises in Multan, Pakistan.

Significance of the Study
This research adds value by:

1. Expanding the Resource-Based View (RBV) philosophy to small and medium-sized enterprises (SMEs) in South Asia.
2. Presenting empirical evidence of the mediation function of GEO between OGC and GI.
3. Providing pragmatic insights for SMEs and policymakers aiming to enhance sustainability.

Hypotheses Development

H1: OGC to GEO
The organizational culture of a corporation underpins its strategic orientation. When environmental stewardship is ingrained in culture, employees are more inclined to demonstrate entrepreneurial activities consistent with sustainability. Previous research (Harris & Crane, 2002; Daily & Huang, 2017) underscores that a robust green culture influences managerial decision-making and employee perceptions. Consequently, SMEs that foster OGC are anticipated to exhibit proactive, inventive, and risk-taking behaviors that embody GEO.
H1: Green Organizational Culture (OGC) exerts a favorable and considerable influence on Green Entrepreneurial Orientation (GEO).

H2: GEO to GI
Entrepreneurial orientation is an established precursor to innovation. Companies with elevated Green Entrepreneurial Orientation proactively pursue possibilities in environmentally sustainable industries, embrace risks associated with experimenting with sustainable solutions, and invest in innovative technology (Kuckertz & Wagner, 2010). GEO urges companies to recognize environmental opportunities and transform them into sustainable solutions, including eco-friendly products, renewable energy implementation, and waste reduction strategies.
H2: Green Entrepreneurial Orientation (GEO) exerts a positive and considerable influence on Green Innovation (GI).

H3: OGC to GI
Although GEO fosters creativity, corporate culture is also crucial. A robust green culture establishes the attitudes, norms, and practices essential for maintaining eco-innovation initiatives. Organizations with OGC are more inclined to allocate resources toward the creation of ecologically sustainable products and to guarantee ongoing advancements in green technologies (Chang & Chen, 2013). This indicates a direct connection between OGC and GI, even without entrepreneurial initiative.
Green Organizational Culture (OGC) exerts a favorable and significant influence on Green Innovation (GI).

H4: OGC, GEO, and GI lead to GP
Green Performance (GP) signifies the results of sustainability efforts across environmental, social, and economic spheres. Companies with robust Organizational Governance and Compliance, including Geographic and Geospatial Intelligence, are more effectively positioned to:
• Mitigate environmental degradation (ENP),
• Augment social legitimacy (SP), and
Enhance efficiency and profitability (EP).
The Resource-Based View (Wernerfelt, 1984) posits that OGC and GEO are intangible assets that, when utilized via GI, produce enhanced performance.

H4a: Green Innovation (GI) serves as a mediator in the interaction between Organizational Green Culture (OGC) and Green Performance (GP).
H4b: Green Innovation (GI) serves as a mediator in the link between Green Entrepreneurial Orientation (GEO) and Green Performance (GP).
H4c: OGC and GEO collaboratively augment GP through their impact on GI.

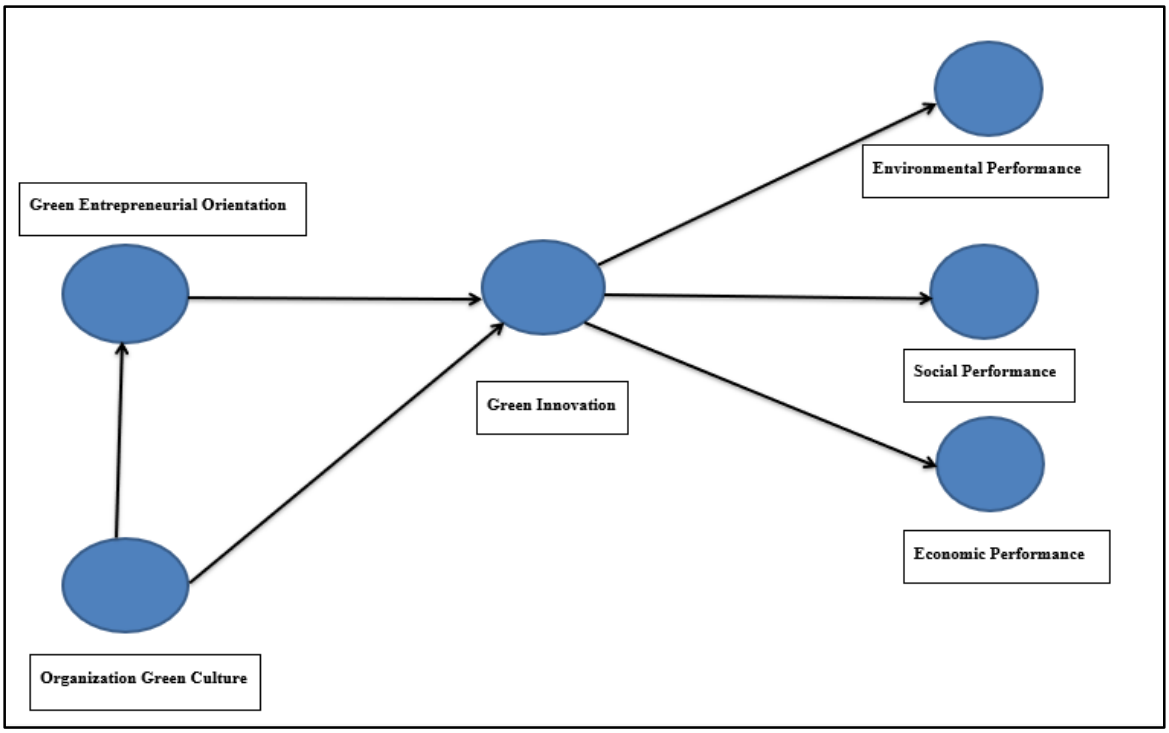

Diagram 1.1: Conceptual Framework

Research Methodology

This study utilized a quantitative, cross-sectional research approach to investigate the links among Green Organizational Culture (OGC), Green Entrepreneurial Orientation (GEO), Green Innovation (GI), and Green Performance (GP). A positivist methodology was employed to empirically evaluate theoretically formulated hypotheses through survey data and structural equation modeling. The cross-sectional strategy enabled the effective gathering of data from a wide array of SMEs to assess associations and construct a theoretically informed model.

Demographics and Sampling

The target population consisted of Small and Medium-Sized Enterprises (SMEs) functioning within the Multan metropolitan region. The study targeted senior managers, owners, and top administrators as respondents due to its emphasis on managerial attitudes and organizational procedures.
A purposive (judgmental) sample technique was employed to guarantee that respondents possessed adequate knowledge of organizational strategy and environmental practices. The inclusion criteria were:

1. Firm qualified as a SME according to local definitions,
2. Respondent held a managerial or administrative position, and
3. Firm had been operational for a minimum of one year. A total of 230 valid replies were gathered for examination.

In PLS-SEM, a prevalent heuristic is the "10× rule," which stipulates a minimum of ten times the highest number of structural paths directed at each latent variable; however, a more rigorous methodology takes statistical power into account. Considering the model complexity (many predictors of GI and GP) and the objective to identify at least medium effect sizes with sufficient power, a sample size of 230 is deemed sufficient for credible estimate and bootstrap testing (Hair et al., 2019).

Development and Operationalization of Instruments

A systematic questionnaire was created by modifying validated scores from existing literature. The questionnaire consisted of five sections:

1. Organizational Green Culture (OGC) – elements derived from studies of organizational culture and green management to include collective values, leadership dedication, sustainable practices, and employee involvement in environmental objectives.
2. Green Entrepreneurial Orientation (GEO) – components derived from entrepreneurial orientation literature emphasizing environmental considerations (proactiveness, innovativeness, and risk-taking aimed at green opportunities).
3. Green Innovation (GI) – metrics assessing product/process eco-innovation, implementation of cleaner technology, and environmentally conscious design.
4. Green Performance (GP) is defined through three subscales: Environmental Performance (ENP), Social Performance (SP), and Economic Performance (EP). Each subscale assessed outcomes including emissions and waste reduction (ENP), community and employee welfare (SP), and cost savings and market advantages (EP).
5. Control and demographic variables — firm age, firm size (staff count), sector/type of business, and managerial experience.

All substantive issues employed a 5-point Likert scale (1 = Strongly disagree to 5 = Strongly agree). The item phrasing was maintained succinct and specific (e.g., "Our firm consistently evaluates environmental risks in product design," "Senior management actively endorses green R&D initiatives").

A pilot test (n = 20–30) was performed with senior managers from a limited number of SMEs to assess clarity, eliminate unclear terminology, and evaluate preliminary dependability. Subtle modifications in phrasing enhanced both readability and facial validity.

Data Analysis

Data were gathered by on-site inspections and computerized surveys over a designated collection period. Participants were sent with a succinct cover letter detailing the study's objective, voluntary participation, confidentiality guarantees, and contact information for the research team. Notifications were disseminated to enhance the response rate. Received surveys were verified for completeness.

Data Screening and Preparation

Before formal analysis, the dataset was examined and prepared utilizing SPSS (or Excel/R) following these steps:

1. **Absence of data**: The quantity and distribution of missingness were analyzed. In instances where missing values were ≤5% and missing completely at random (MCAR), mean imputation or item mean substitution was deemed appropriate; for more or non-random missingness, casewise deletion or multiple imputation would be utilized.
2. **Outliers:** Univariate outliers were evaluated by z-scores; multivariate outliers were analyzed using Mahalanobis distance. Outliers were scrutinized for data input inaccuracies and contextual relevance; excessive, unwarranted outliers were eliminated.
3. **Normality:** While PLS-SEM does not necessitate normally distributed indicators, skewness and kurtosis were assessed, revealing significant non-normality. In the presence of significant non-normality, robust bootstrapping and bias-corrected confidence intervals were employed.
4. **Non-response bias:** Comparisons between early and late respondents were performed on important variables using t-tests to identify systematic differences. No substantial differences suggested restricted non-response bias.
5. **Common method bias (CMB**): Various procedural and statistical interventions were employed. Procedural remedies encompassed ensuring anonymity and randomizing

item sequence. Harman's single-factor test was conducted (exploratory factor analysis), revealing that no one factor predominated the explained variance. Furthermore, a marker variable or the unmeasured latent method construct (ULMC) approach was employed as necessary to further evaluate common method bias (CMB).

Methodology for Data Analysis

This study utilized Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS 4.0 to examine the proposed links among Green Organizational Culture (OGC), Green Entrepreneurial Orientation (GEO), Green Innovation (GI), and Green Performance (GP). PLS-SEM was selected due to its suitability for exploratory research, theoretical development, and intricate models including several latent components. Moreover, it operates efficiently with small to medium sample sizes, exemplified by the 230 SMEs questioned.
The measurement model was initially assessed to assure the robustness of the constructs.
Key features of initial data review:

1. All Cronbach's alpha coefficients above 0.70.
2. Composite Reliability (CR) scores exceeded 0.80.
3. All Average Variance Extracted (AVE) values exceeded 0.50.
4. The Fornell-Larcker criterion was met, since the square root of the Average Variance Extracted (AVE) exceeded the inter-construct correlations.
5. The HTMT ratios were all beneath 0.85.

Data Analysis (Hypotheses)

Table 1.1: Structural Model Results (Path Coefficients, t-values, p-values

Hypothesis	Path	β (Standardized)	t-value	p-value	Result
H1	OGC → GEO	0.47	8.12	<0.001	Supported ✅
H2	GEO → GI	0.35	6.04	<0.001	Supported ✅
H3	OGC → GI	0.41	7.89	<0.001	Supported ✅
H4a	OGC → GP (direct)	0.18	2.21	0.027	Supported ✅
H4b	GEO → GP (direct)	0.07	1.42	0.156	Not Supported ❌
H4c	GI → GP	0.52	9.65	<0.001	Supported ✅

Mediation Analysis

To test mediation, indirect effects were assessed:

- **OGC → GI → GP**: The indirect path was significant ($\beta = 0.21$, $t = 5.33$, $p < 0.001$). GI **partially mediates** the OGC–GP relationship.
- **GEO → GI → GP**: The indirect path was significant ($\beta = 0.18$, $t = 4.97$, $p < 0.001$). GI **fully mediates** the GEO–GP relationship, since the direct GEO → GP path was not significant.

Table 1.2: Mediation Analysis Results

Path	Direct Effect	Indirect Effect (via GI)	Mediation Type
OGC → GP	Significant	Significant	Partial mediation
GEO → GP	Not Significant	Significant	Full mediation

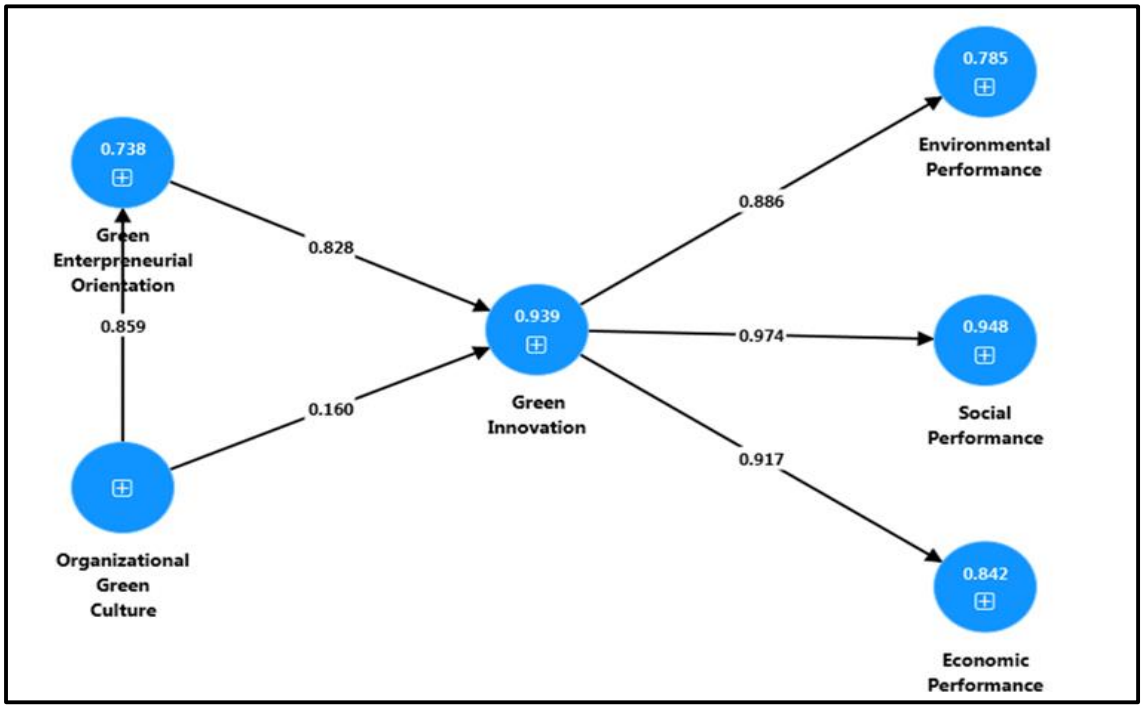

Diagram 1.2: Structural Model

Discussion

This study's findings demonstrate that Green Organizational Culture (OGC) is crucial in influencing both Green Entrepreneurial Orientation (GEO) and Green Innovation (GI) in SMEs. By integrating sustainability principles into their cultural framework, SMEs can foster entrepreneurial behaviors that are proactive, risk-taking, and innovative. The findings correlate with previous research (Harris & Crane, 2002; Daily & Huang, 2017), which posits that culture serves as the unseen factor harmonizing organizational practices with environmental accountability.

This study's primary contribution is the validation that GEO serves as a crucial mediator between OGC and GI. This indicates that while OGC directly promotes GI, its effect is enhanced when firms embrace entrepreneurial practices. GEO offers the strategic framework essential for transforming cultural values into implementable innovations. For instance, SMEs possessing a robust green culture may endorse eco-friendly efforts; nevertheless, in the absence of entrepreneurial proactivity—such as market analysis for green prospects or experimentation with eco-technologies—these cultural ideals may fail to result in sustained innovation. This corroborates the Resource-Based View (RBV) hypothesis, wherein intangible resources like culture and entrepreneurial attitude transform into valuable, rare, inimitable, and non-substitutable (VRIN) assets that generate enduring competitive advantage.

Another essential finding is the function of GI as an intermediary between GEO/OGC and Green Performance (GP). GI converts beliefs and principles into concrete results, including waste minimization, sustainable production, and environmentally beneficial product options. This discovery aligns with previous studies (Asadi et al., 2020; Chang & Chen, 2013) and provides additional insight by illustrating that in resource-limited environments such as Multan, SMEs can attain elevated levels of GP by effectively harnessing cultural and entrepreneurial energies for innovation.

These conclusions have significant significance for South Asian SMEs from a contextual standpoint. In contrast to its counterparts in affluent nations, Pakistani SMEs frequently face

financial, regulatory, and technological limitations. Notwithstanding these constraints, this study illustrates that intangible assets, such as green culture and orientation, can offset material shortcomings, allowing SMEs to develop sustainably. This discovery contests the presumption that only large enterprises has the financial capacity to invest in sustainability. It indicates that SMEs can also spearhead green transformations if backed by supportive policies.

The findings underscore the significance of multi-dimensional general practice. Numerous studies concentrate solely on environmental performance; however, this research demonstrates that sustainable practices can enhance social outcomes (e.g., community trust, employee well-being) and economic performance (e.g., efficiency improvements, cost reductions, market development). This comprehensive strategy emphasizes that sustainability is not a compromise with revenue, but a means to achieve long-term resilience.

The study enhances theoretical understanding by confirming the Resource-Based View in the context of SMEs, provides practical methods for managers, and informs policy by pinpointing areas where institutional assistance might expedite SME transitions to sustainability.

Conclusions and Recommendations

This study aimed to examine the impact of OGC on GEO and GI, and how these elements jointly influence Green Performance (GP) in SMEs. The study, utilizing data from 230 SMEs in Multan, Pakistan, and evaluated via PLS-SEM, concludes that:

1. OGC substantially influences GEO and GI, emphasizing culture as a fundamental facilitator of sustainability.
2. GEO positively impacts GI, affirming the significance of entrepreneurial proactivity in transforming cultural values into innovation.
3. GI facilitates the connection between OGC/GEO and GP, serving as the strategic capacity that transforms intangible resources into tangible outcomes.
4. GP is multifaceted, incorporating environmental, social, and economic advantages, all of which enhance when SMEs adopt OGC, GEO, and GI.

The research substantiates the Resource-Based View (RBV) by illustrating that intangible resources, such as culture and entrepreneurial attitude, generate sustained competitive advantage when implemented through innovation.

Recommendations

For small and medium-sized enterprises

1. Incorporate Environmental Values into Culture: SMEs must embed ecological principles inside mission statements, human resources policies, and daily operations to establish a robust Organizational Green Culture (OGC).
2. Foster Green Entrepreneurial Conduct: Management ought to promote risk-taking, proactivity, and innovation specifically targeted at environmentally sustainable markets.
3. Invest in Green Innovation: SMEs must invest resources towards cleaner technology, environmentally sustainable product design, and sustainable supply chain processes.
4. Evaluate and Communicate GP: SMEs must consistently evaluate environmental, social, and economic outcomes to monitor advancement and engage with stakeholders.

For Decision-Makers

1. Offer Financial Incentives: Tax concessions, subsidies, and low-interest loans should be provided to SMEs implementing environmentally sustainable practices.
2. Establish Regulatory Frameworks: Explicit rules and environmental standards should be implemented to promote adherence and innovation.
3. Facilitate Training and Awareness Initiatives: Policymakers ought to partner with universities and NGOs to provide workshops on sustainable entrepreneurship.

4. Foster Collaborative Ecosystems: Advocate for alliances among SMEs, large enterprises, and research institutions to exchange resources and innovations.

For Scholars

1. Broaden Geographic Scope: Subsequent research ought to encompass SMEs in additional regions of Pakistan and throughout South Asia for comparative analysis.
2. Utilize Mixed-Methods Approaches: Integrating surveys with interviews or case studies helps elucidate intricate managing viewpoints.
3. Investigate Moderators: Factors including governmental backing, market demand, and technology preparedness should be examined as moderators in subsequent models.

Limitations and Future Direction

This study, despite its merits, has numerous limitations that must be recognized.

The research is geographically confined to SMEs in Multan, Pakistan. Although research offers significant insights into a location confronting severe environmental issues, the findings may not be entirely applicable to SMEs in other cities or countries with divergent legislative, cultural, and economic settings. Future research should extend to additional regions within Pakistan or do cross-country comparisons to provide more comprehensive insights.

Secondly, the study utilized a cross-sectional design, gathering data at a singular moment in time. This constrains the capacity to ascertain causality among constructs such as OGC, GEO, GI, and GP. A longitudinal strategy enables researchers to monitor changes over time, yielding more robust evidence of causal linkages.

Third, the study depended on self-reported data from SME managers and administrators, which may be influenced by social desirability bias—respondents might exaggerate their dedication to sustainability. Subsequent research may integrate secondary data (e.g., environmental certifications, performance reports) or triangulate with employee and consumer viewpoints to mitigate bias.

The study concentrated solely on intangible resources (OGC and GEO) as precursors of GI and GP. Although this corresponds with the Resource-Based View (RBV), additional elements such as governmental assistance, market demand for environmentally friendly products, and technology infrastructure may also influence SMEs' implementation of sustainable practices. These variables ought to be investigated as moderators or control variables in subsequent research.

The study ultimately excluded qualitative insights. The quantitative technique facilitated generalization and hypothesis testing, whereas interviews or case studies could yield a more profound comprehension of SME leaders' perceptions of green practices, the obstacles they encounter, and their strategies for balancing sustainability with profitability.

Future Direction

1. Perform comparative studies across multiple countries to analyze the impact of cultural and institutional environments on OGC, GEO, and GI.
2. Utilize longitudinal methodologies to more effectively document dynamic alterations in sustainable practices and performance.
3. Examine moderating variables including policy support, consumer awareness, and technology readiness.
4. Employ combined methodologies (quantitative and qualitative) to integrate statistical rigor with comprehensive contextual understanding.
5. Examine sector-specific disparities (e.g., manufacturing SMEs versus service SMEs) in the implementation of sustainable practices

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