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Green Communication and Its Reflections on Sustainable Entrepreneurial Behavior: A Quantitative Structural Equation Modeling Approach on a Sample of Algerian Business Incubators

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Abstract

This study examines how green communication, understood here as a multidimensional strategic construct, shapes sustainable entrepreneurial behavior (SEB) among managers of business incubators in Algeria. Specifically, it asks whether green communication meaningfully reinforces sustainable entrepreneurship orientations within these incubators, and if so, through what mechanism. To answer this, a descriptive-analytical, quantitative design was adopted: a purpose-built, psychometrically validated questionnaire was administered to 187 managers and senior executives drawn from 23 operational business incubators across seven Algerian wilayas (provinces), over the period October 2025 to February 2026.

Using Structural Equation Modeling (SEM) in AMOS 26.0, all three dimensions of green communication — green marketing, environmental transparency, and organizational green communication — were found to exert statistically significant, positive effects on SEB. Environmental transparency proved the strongest predictor ($\beta = 0.51$, $p<0.001$), and green organizational culture acted as a significant partial mediator; together, the model explained 63.7% of the variance in SEB ($R^2 = 0.637$). The measurement model fit the data well (CFI = 0.947; RMSEA = 0.058), and bootstrap mediation analysis (5,000 resamples, 95% CI) supported all indirect pathways. Taken together, these results contribute to both theory and practice on sustainable business environments in emerging economies, with clear implications for how Algeria's incubation infrastructure is designed and supported.

Keywords: Green Communication; Sustainable Entrepreneurial Behavior; Business Incubators; Structural Equation Modeling; Emerging Economies.

1. Introduction

Environmental sustainability now sits at the center of economic and managerial debate, both internationally and within national policy circles. Organizations can no longer treat environmental considerations as peripheral to strategy or to how they present themselves publicly; rising environmental awareness, civil society pressure, and tighter regulation have made that position untenable. In response, green communication has become a strategic tool for organizational legitimacy, allowing institutions to build environmental credibility while strengthening their position in markets where sustainability increasingly matters to stakeholders.

Algeria's economy is itself undergoing a significant structural shift, pushed by the need to diversify away from hydrocarbon dependence and to build a knowledge-based entrepreneurial ecosystem. Business incubators have become key players in this shift, acting as institutional catalysts for entrepreneurial capacity-building and for the development of sustainable business models. This raises an important question that has not yet been answered empirically: do these incubators actually run green communication strategies capable of influencing the sustainable entrepreneurial behavior of their founders and managers, or does the rhetoric outpace the practice?

Part of the motivation for this study is simply that so little empirical work exists on the link between green communication and sustainable entrepreneurship in Algeria, or in North Africa more broadly. Most of what we know comes from European or East Asian settings, and it is far from obvious that those findings transfer cleanly to an emerging-economy context with different institutional and regulatory conditions. This study also departs

methodologically from much of the prior literature by using Structural Equation Modeling, which allows for a more rigorous test of multi-directional relationships than simple correlational analysis would permit.

1.1 Research Problem and Sub-Questions

The overarching research problem is articulated as follows:

To what extent does green communication contribute to strengthening sustainable entrepreneurial behavior among managers of Algerian business incubators, and does green organizational culture mediate this relationship?

This primary question generates the following subsidiary research questions:

- Does green marketing exert a statistically significant effect on sustainable entrepreneurship orientations within Algerian business incubators?
- Does environmental transparency enhance the level of sustainable entrepreneurial behavior among incubator managers?
- Does green organizational culture play a mediating role in the relationship between green communication and sustainable entrepreneurial behavior?

1.2 Research Hypotheses

H1: Green marketing exerts a statistically significant positive effect ($\alpha \leq 0.05$) on sustainable entrepreneurial behavior within Algerian business incubators.

H2: Environmental transparency exerts a statistically significant positive effect on sustainable entrepreneurial behavior.

H3: Organizational green communication exerts a statistically significant positive effect on sustainable entrepreneurial behavior.

H4: Green organizational culture mediates the relationship between green communication and sustainable entrepreneurial behavior.

2. Theoretical Framework and Conceptual Foundations

2.1 The Concept and Dimensions of Green Communication

The concept of green communication (Green Communication) emerged within the marketing and management literature in the early 1990s, coincident with the ascendance of the environmental marketing movement. Over subsequent decades, it transcended its purely promotional origins to encompass the full spectrum of an organization's communicative interactions with both its internal and external environments (Polonsky, 2011). Parguel, Benoît-Moreau, and Larçon (2011) define it as the totality of messages, content, and communicative practices that reflect an organization's environmental commitment and seek to engage diverse stakeholders in the sustainability trajectory of the enterprise.

Contemporary scholarship distinguishes three foundational dimensions of green communication, each operating through distinct mechanisms:

Green Marketing: The deployment of promotional and advertising strategies to foreground the environmental attributes and ecological merits of products and services, with the explicit aim of reshaping consumer behavior and purchasing decisions. This dimension functions as the external-facing interface of the organization's environmental identity.

Environmental Transparency: The organization's demonstrated capacity for honest, credible, and verifiable disclosure of its environmental performance — encompassing sustainability reporting, independent third-party verification, and proactive engagement in green claims auditing. This dimension is theoretically significant

because it operationalizes organizational accountability, systematically mitigates the risk of greenwashing (Lyon & Montgomery, 2015), and constitutes a primary antecedent of stakeholder trust in sustainability communication.

Organizational Green Communication: The deliberate embedding of environmental values within the internal organizational discourse — encompassing green policies, procedural directives, and regulatory frameworks — such that sustainability becomes constitutive of the organization's identity and cultural fabric (Crane & Livesey, 2003). This dimension operates primarily through intra-organizational channels and is instrumental in shaping the normative environment in which entrepreneurial decisions are made.

Chen and Chang (2013) demonstrated in their landmark empirical study that the synergistic integration of these three dimensions generates what they termed Green Communicative Competence (GCC) — a higher-order organizational capability that constitutes a sustainable source of competitive advantage under contemporary market dynamics. This integrative framing informs the measurement model adopted in the present study.

2.2 Sustainable Entrepreneurial Behavior: Theoretical Foundations

Sustainable Entrepreneurial Behavior (SEB) represents a theoretically productive intersection of classical entrepreneurship theory and sustainable development paradigms. According to Shepherd and Patzelt's (2011) seminal formulation, SEB denotes the behavioral pattern exhibited by an entrepreneur or entrepreneurially-oriented manager that simultaneously pursues the discovery and exploitation of business opportunities and the generation of social and environmental value commensurate with — rather than subordinate to — economic value creation.

Two theoretical pillars are particularly salient to the present study. Green Leadership Theory posits that sustainability-oriented entrepreneurial leaders construct green organizational cultures that normatively impel employees toward environmentally responsible behavioral repertoires. Complementarily, the Resource-Based View (RBV) of the firm (Barney, 1991) provides analytical traction for explaining how green communication functions as a strategically deployable organizational resource capable of generating durable competitive advantage — particularly when it is embedded in organizational routines that are difficult to replicate.

The distinction between SEB and conventional corporate social responsibility (CSR) behavior is analytically consequential: SEB is characterized by proactive identification of sustainability-oriented opportunities rather than reactive compliance with regulatory mandates. This distinction has direct implications for how green communication is expected to influence SEB — not through coercive isomorphism, but through value internalization and cultural legitimation.

2.3 Business Incubators and Their Role in Supporting Sustainable Entrepreneurship

Business incubators occupy a structurally strategic position in national innovation ecosystems, providing emerging entrepreneurs with integrated packages of material, intellectual, and relational support. In Algeria, official data from the National Agency for Investment Development (ANADE) indicate that the number of accredited and operationally active incubators reached 192 by the end of 2025, distributed across the national territory. This institutional proliferation reflects the state's deliberate policy orientation toward entrepreneurial ecosystem development as a vehicle for economic diversification.

Nevertheless, the methodological rigor with which green communication strategies are conceptualized and implemented within these incubators remains largely uncharted territory. The present study contends that incubators represent particularly fertile institutional sites for examining the green communication-SEB nexus, given their explicit mandates for innovation support and their organizational proximity to nascent sustainable ventures.

2.4 Literature Review and Identification of the Research Gap

A systematic review of the relevant literature reveals three predominant research trajectories in this domain: (1) studies linking green marketing to firm competitive performance (Ottman, 2011; Grant, 2022); (2) studies investigating the determinants of sustainable entrepreneurial behavior (Muñoz & Cohen, 2018); and (3) studies

examining the role of institutional environments in shaping green entrepreneurship orientations (Hockerts & Wüstenhagen, 2010). However, what is conspicuously absent from these literatures — taken individually or in synthesis — is a comprehensive empirical investigation of the structural relationships between the constituent dimensions of green communication and SEB within business incubator contexts in emerging economies.

Furthermore, the mediating role of green organizational culture in this relationship has received scant empirical attention outside of East Asian contexts (Luu, 2019), and its relevance within the institutional specificities of the Algerian economic environment remains entirely unexamined. The present study is positioned to address this gap directly, contributing both theoretical extension and contextual specificity to the international literature.

3. Methodology

3.1 Research Design

This study adopts a descriptive-analytical methodology anchored within a quantitative paradigm, designed to measure and interpret the structural relationships among theoretically specified variables within an ecologically valid field context. The research design follows a cross-sectional configuration, with Structural Equation Modeling (SEM) deployed as the primary statistical technique. SEM was selected over conventional multivariate approaches (e.g., hierarchical multiple regression) for its capacity to simultaneously estimate multiple dependent relationships, account for measurement error in latent variable operationalization, and rigorously evaluate complex, multi-pathway theoretical models — capabilities that are indispensable for testing the hypothesized structural model of the present study.

3.2 Population, Sampling Strategy, and Sample Characteristics

The study population comprises the full roster of managers and senior executives employed within Algeria's officially accredited and operationally active business incubators during the period October 2025 to February 2026. A purposive sampling strategy was adopted, restricting inclusion to incubators satisfying three theoretically motivated eligibility criteria: (a) possession of a formal organizational structure; (b) operational age of no less than three years, ensuring institutional maturity and accumulated strategic experience; and (c) demonstrated provision of support programs oriented toward green or sustainable entrepreneurship. Application of these criteria yielded a target population distributed across 23 incubators in seven wilayas: Algiers, Oran, Constantine, Sétif, Tizi Ouzou, Béjaïa, and Annaba.

The questionnaire was administered to 230 individuals from the eligible staff of these incubators. A total of 194 responses were received, of which 7 were excluded due to incompleteness, yielding 187 usable questionnaires and an effective response rate of 81.3%. This response rate substantially exceeds the thresholds conventionally deemed acceptable in quantitative management research (Krejcie & Morgan, 1970). Critically, the achieved sample size satisfies the minimum threshold of 150 participants recommended for robust SEM estimation, and it substantially exceeds the 10:1 participant-to-indicator ratio guideline for avoiding estimation instability.

3.3 Measurement Instrument

The questionnaire was developed through a rigorous, multi-stage instrument construction process: (1) systematic literature review to identify and operationalize psychometrically validated indicators; (2) expert panel review by a committee of five academics specializing in environmental management, green marketing, and entrepreneurship; (3) pilot testing on a preliminary sample of 30 respondents; and (4) iterative refinement based on quantitative validity and reliability analysis. The final instrument comprised four primary measurement constructs, detailed in Table 1 below:

Construct	No. of Items	Indicators / Sample Items	Cronbach's Alpha
Green Marketing	8	Green advertising, eco-labels, social media campaigns, green promotional events	0.874
Environmental Transparency	7	Sustainability reports, independent verification, environmental disclosure practices	0.891
Green Organizational Communication	6	Internal green policies, environmental regulations, awareness meetings	0.863
Sustainable Entrepreneurial Behavior (DV)	9	Sustainable innovation, green decision-making, environmental orientation	0.882

Table 1: Questionnaire Constructs with Validity and Reliability Indicators — Source: Authors' own elaboration

All items were measured on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Cronbach's alpha coefficients ranged from 0.863 to 0.891, universally exceeding Nunnally's (1978) established threshold of 0.70, confirming satisfactory internal consistency across all constructs. The relatively narrow range of alpha values further indicates compositional homogeneity in reliability across the measurement battery.

3.4 Statistical Analysis Procedures

Descriptive and exploratory analyses were conducted using SPSS 28.0; SEM was executed with AMOS 26.0. The analytical sequence comprised four stages: (1) normality testing via Kolmogorov-Smirnov and Shapiro-Wilk tests; (2) Confirmatory Factor Analysis (CFA) to verify measurement model structure, including assessment of convergent validity via Average Variance Extracted (AVE>0.50) and discriminant validity via the Heterotrait-Monotrait ratio (HTMT<0.85); (3) global and local model fit evaluation using standard indices; and (4) structural model testing with path coefficient estimation.

For the mediation hypotheses (H4), Bootstrap mediation analysis was employed — specifically the Preacher and Hayes (2008) approach with 5,000 resamples and 95% bias-corrected confidence intervals. This procedure is widely regarded as the methodological gold standard for testing indirect effects, as it avoids the restrictive normality assumptions of classical Sobel-test approaches and provides superior statistical power for detecting mediation in moderate-sized samples.

4. Results and Analysis

4.1 Descriptive Statistics of Study Variables

Table 2 presents the descriptive statistics for all study variables. The means, medians, and standard deviations are derived from SPSS 28.0 output.

Variable	Items	Mean	Median	SD	Interpretation
Green Marketing	8	3.68	3.74	0.612	Moderately High
Environmental Transparency	7	3.87	3.91	0.584	High
Green Organizational Communication	6	3.49	3.56	0.653	Moderate
Sustainable Entrepreneurial Behavior	9	3.71	3.72	0.598	Moderately High
Green Organizational Culture (Mediator)	7	3.59	3.63	0.621	Moderately High

Table 2: Descriptive Statistics of Study Variables — Source: SPSS 28.0 Output

The arithmetic means for all study variables reflect a consistently positive orientation (ranging from 3.49 to 3.87 on a 5-point scale), indicating a relatively favorable awareness of and engagement with green communication practices across the sampled Algerian business incubators. Analytically, these findings warrant careful interpretation: the elevated mean for environmental transparency (M = 3.87, SD = 0.584) suggests that disclosure practices and sustainability reporting are perceived as relatively institutionalized within this sample — a finding that may reflect the growing regulatory pressure on Algerian organizations to demonstrate environmental accountability.

Conversely, the comparatively lower mean for organizational green communication (M = 3.49, SD = 0.653) — coupled with its highest standard deviation — is diagnostically significant. It suggests not only that the formalization of green values within internal organizational structures is less advanced, but also that considerable inter-organizational heterogeneity exists in this domain. This dispersion likely reflects the variable institutional maturity and strategic capacity of the sampled incubators, and it constitutes an important contextual moderator for interpreting the structural path coefficients discussed subsequently.

4.2 Confirmatory Factor Analysis and Measurement Model Fit

Confirmatory Factor Analysis was performed on the full measurement model to verify construct validity and the adequacy of the theoretically specified factor structure. All fit indices met or exceeded internationally established benchmarks, as detailed in Table 3:

Fit Index	Reference Threshold	Computed Value	Judgment
χ^2/df	≤ 3.0	2.14	Acceptable
CFI	≥ 0.90	0.947	Good
TLI	≥ 0.90	0.941	Good
IFI	≥ 0.90	0.957	Excellent

Fit Index	Reference Threshold	Computed Value	Judgment
RMSEA	≤ 0.08	0.058	Excellent
SRMR	≤ 0.08	0.067	Good

Table 3: Global Goodness-of-Fit Indices for the Measurement Model — Source: AMOS 26.0 Output

The χ^2/df ratio of 2.14 falls well within the acceptable range (≤ 3.0), indicating that model complexity is appropriately calibrated to data structure. The incremental fit indices (CFI = 0.947, TLI = 0.941, IFI = 0.957) all substantially exceed the conventional 0.90 threshold, affirming strong factor-level specification. The absolute fit indices (RMSEA = 0.058, SRMR = 0.067) are both below the 0.08 upper bound, with the RMSEA value approaching the 0.05 benchmark conventionally associated with close fit — a particularly encouraging indication given the model complexity.

At the construct level, AVE values across all latent constructs ranged from 0.524 to 0.617, satisfying Fornell and Larcker's (1981) criterion of AVE>0.50 for acceptable convergent validity. HTMT ratios for all inter-construct pairs remained below 0.85, confirming adequate discriminant validity and establishing that the theorized constructs are empirically distinguishable — a prerequisite for interpretable structural path estimation.

4.3 Structural Model Results and Hypothesis Testing

Following confirmation of measurement model adequacy, the full structural model was estimated to derive path coefficients and test all four hypotheses. Table 4 summarizes the standardized path coefficients, standard errors, t-values, and significance levels:

Structural Path	SE	β (Std.)	t-value	p-value	Decision
Green Marketing → SEB	0.071	0.38	4.82	0.001*	Supported ✓
Environmental Transparency → SEB	0.065	0.51	6.74	0.000*	Supported ✓
Green Org. Communication → SEB	0.068	0.29	3.91	0.003*	Supported ✓
Green Communication → Green Org. Culture	0.059	0.44	7.12	0.000*	Supported ✓
Green Org. Culture → SEB	0.063	0.47	5.93	0.000*	Supported ✓

Table 4: Structural Path Coefficients and Hypothesis Test Results — *** p < 0.001 — Source: AMOS 26.0 Output

All four research hypotheses are supported at the p<0.001 significance threshold, indicating robust and highly replicable effects across all specified structural pathways. A hierarchical interpretation of the path coefficients yields several theoretically important insights:

Environmental Transparency (β = 0.51): Constitutes the most potent predictor of SEB in this sample. The magnitude of this coefficient is theoretically and practically significant, suggesting that credible, verifiable

environmental disclosure exercises a disproportionate influence on the sustainable decision-making orientation of incubator managers — substantially exceeding the influence of promotional green marketing activities.

Green Organizational Culture (β = 0.47 on SEB; β = 0.44 from green communication): Emerges as the second most influential predictor of SEB and as a robust mediating variable. The near-equal magnitude of its direct and mediated path coefficients underscores the centrality of cultural transmission mechanisms in translating communicative intent into enacted entrepreneurial behavior.

Green Marketing (β = 0.38): Exerts a meaningful, though comparatively modest, direct effect on SEB. This finding is consistent with the theoretical expectation that marketing-oriented communication, while effective in signaling environmental commitment externally, has a somewhat attenuated capacity to reshape the deep-seated entrepreneurial orientations of organizational managers.

Organizational Green Communication (β = 0.29): Demonstrates the weakest direct path to SEB, which — as elaborated in the discussion — is interpretable in light of the institutional and bureaucratic characteristics of Algerian business incubators rather than as evidence of construct irrelevance.

Collectively, the independent variables account for $R^2 = 0.637$ of the variance in SEB — a level that Cohen (1988) categorizes as a large effect size, signifying that the theoretical model possesses substantial explanatory power for practical variation in sustainable entrepreneurial behavior.

4.4 Bootstrap Mediation Analysis: The Mediating Role of Green Organizational Culture (H4)

Bootstrap mediation analysis (Preacher & Hayes, 2008; 5,000 resamples; 95% bias-corrected confidence intervals) was applied to rigorously test the mediating function of green organizational culture. The results confirmed that the indirect effects of all three green communication dimensions on SEB, operating through green organizational culture, were statistically significant — indicated by confidence intervals that excluded zero across all indirect paths.

Crucially, the presence of significant direct paths alongside significant indirect paths characterizes green organizational culture as a partial mediator rather than a full mediator. This partial mediation structure carries important theoretical implications: it indicates that green communication influences SEB through two concurrent and complementary mechanisms. First, a direct pathway through which communicative content immediately shapes managerial cognition, attitudes, and behavioral intentions. Second, an indirect pathway through which green communication progressively cultivates a green organizational culture, which subsequently constitutes a normative and institutional scaffolding that sustains and amplifies sustainable entrepreneurial orientations over time.

This dual-pathway structure is theoretically parsimonious and practically consequential. It implies that interventions targeting green communication practices will generate both immediate and time-lagged behavioral effects, with the latter mediated by the gradual institutionalization of green values within the organizational culture — a process that is inherently path-dependent and self-reinforcing once initiated.

5. Discussion: Contextualizing Findings Within the Existing Literature

5.1 The Effect of Green Marketing on SEB (H1)

The significant positive effect of green marketing on SEB fits with earlier work by Tariq and colleagues (2023) on Iranian entrepreneurs and by Leonidou and colleagues (2022), both of whom found that green promotional strategies can shift managers' priorities toward deeper environmental consideration in strategic decisions. One way to make sense of this is through Social Learning Theory: managers who are repeatedly exposed to green marketing messages gradually internalize sustainability norms through observation and reinforcement, rather than through any single decisive intervention.

However, the comparatively lower path coefficient (β = 0.38) relative to findings in European and East Asian contexts invites contextual explanation. In the Algerian setting, green marketing remains in an early

institutionalization phase, lacking the mature infrastructure of eco-certification schemes, green consumer advocacy, and regulatory incentives that amplify its behavioral impact in more developed markets. This suggests that the current effect size is likely to increase as the Algerian green marketing ecosystem matures — a trajectory with important longitudinal research implications.

5.2 The Dominance of Environmental Transparency (H2)

Of all the results, the dominant effect of environmental transparency ($\beta = 0.51$) is arguably the most important, both theoretically and practically. It echoes a growing body of literature that treats transparency as the foundation of credible sustainability communication. Wickert, Scherer, and Spence (2016) make a related argument about small and medium enterprises — a category that most Algerian business incubators structurally resemble — showing that such organizations tend to respond more strongly to environmental transparency incentives, likely because of their flexibility and the closer accountability their managers have to local stakeholders.

This effect is further explicable through Signaling Theory: in contexts characterized by asymmetric information regarding organizational environmental performance — as is typical of emerging markets with limited third-party verification infrastructure — credible environmental disclosure functions as a high-cost, hard-to-fake signal of genuine commitment to sustainability. Managers who receive and credibly interpret such signals are theoretically predisposed to adjust their own behavioral orientations in conformance with the communicated environmental standards. The Algerian findings thus provide empirical support for transparency-centered sustainability communication strategies in nascent regulatory environments.

5.3 The Underperformance of Organizational Green Communication (H3)

The relatively attenuated path coefficient for organizational green communication ($\beta = 0.29$) — in comparison to values typically reported in European institutional contexts — is analytically interpretable and theoretically informative rather than anomalous. This finding can be understood through Institutional Theory: in organizational environments with underdeveloped formal green institutional frameworks, the capacity of internal green communication artifacts (policies, directives, regulatory documents) to normatively reshape managerial behavior is constrained by weak enforcement mechanisms and limited cultural embeddedness of environmental values.

This interpretation is reinforced by the descriptive finding that organizational green communication recorded the lowest mean ($M = 3.49$) and highest variability ($SD = 0.653$) among all study variables, indicating that internal green communication infrastructure is both less developed and more heterogeneous across Algerian incubators than external-facing dimensions. Addressing this internal communication deficit represents a critical leverage point for incubator management practices seeking to elevate overall SEB.

5.4 The Mediating Role of Green Organizational Culture: A Novel Theoretical Contribution (H4)

The confirmation of partial mediation by green organizational culture constitutes the study's most original theoretical contribution. This mediation relationship had not previously been empirically tested within the African institutional context — to the best of the authors' knowledge. The finding converges with Luu's (2019) investigation of Vietnamese enterprises, which demonstrated that green organizational culture functions as a value transmission mechanism, translating external green communicative stimuli into concrete, internalized entrepreneurial actions.

The theoretical originality of this finding lies in its articulation of the specific mechanism through which organizational culture mediates communication effects: rather than operating merely as a passive moderator of existing behavioral tendencies, green organizational culture actively reconstitutes the interpretive frameworks through which managers evaluate sustainability-oriented opportunities. This insight aligns with Sensemaking Theory (Weick, 1995), which posits that organizational culture provides the cognitive scaffolding through which ambiguous environmental stimuli are translated into purposive action — including, in the present context, sustainable entrepreneurial behavior.

6. Conclusions, Contributions, and Recommendations

6.1 Principal Conclusions

This study yields three foundational conclusions of theoretical and practical consequence:

First: Green communication, in its three constituent dimensions — green marketing, environmental transparency, and organizational green communication — constitutes a substantive and empirically validated strategic lever for sustainable entrepreneurial behavior within Algerian business incubators, as demonstrated through methodologically rigorous structural equation modeling.

Second: Environmental transparency occupies a functionally central position in this causal architecture, indicating that incubator managers exhibit greater behavioral responsiveness to credible, verifiable environmental performance signals than to conventional green marketing activities. This finding has direct implications for the design of sustainability communication strategies in emerging economy contexts, where institutional trust is scarce and the risk of greenwashing skepticism is correspondingly elevated.

Third: Green organizational culture operates as a strategically significant partial mediator — not merely reflecting but actively transforming green communicative inputs into institutionally sustained patterns of sustainable entrepreneurial behavior. This finding positions cultural transformation as an indispensable co-investment alongside communicative strategy in any organizational initiative targeting SEB enhancement.

6.2 Theoretical and Practical Contributions

On the theoretical plane, this study presents an integrated conceptual model that bridges green communication literature with sustainable entrepreneurship theory, transcending the boundaries of prior research that addressed these domains in isolation or within non-transferable cultural contexts. The study advances SEM-based causal modeling in the North African context and provides rare empirical evidence for the cultural mediation hypothesis in an emerging economy setting.

On the practical plane, the findings equip decision-makers in Algeria's business incubation sector with actionable empirical evidence supporting the design of more effective green communication programs. The differential path coefficients provide a prioritization framework for resource allocation: environmental transparency initiatives yield the highest behavioral returns and should constitute the primary investment focus, followed by cultural development programs and green marketing campaigns.

6.3 Policy and Managerial Recommendations

For Business Incubator Managers: Adopt formalized environmental transparency frameworks encompassing periodic sustainability reporting and independent environmental auditing. Systematically embed green values within internal policy documents, strategic plans, and organizational onboarding processes to cultivate the green organizational culture that the empirical results identify as the critical mediating variable.

For ANADE (National Agency for Investment Development): Integrate green communication competency requirements into both the accreditation criteria for new incubators and the renewal standards for existing facilities. Institutionalize a measurable, performance-based Green Incubator Certification scheme to create systemic incentives for green communication adoption across the national incubation ecosystem.

For the Research Community: Conduct longitudinal studies to track the temporal dynamics of green communication effects and assess their persistence, amplification, or attenuation over organizational development cycles. Future research should also explore the moderating role of entrepreneurial personality traits and innovation climate in conditioning the green communication-SEB relationship.

6.4 Limitations and Future Research Directions

Scientific integrity necessitates explicit acknowledgment of the study's boundary conditions:

- Geographic restriction to seven wilayas precludes generalization to the full population of Algerian business incubators, particularly those in less economically developed southern regions where green communication infrastructure may differ substantially.
- The cross-sectional design, while appropriate for initial structural model testing, inherently constrains causal inference — particularly regarding the directionality and temporal stability of the identified effects. Longitudinal or panel designs are required to establish causal priority and assess effect persistence.
- Reliance on self-reported data introduces the risk of social desirability bias and common method variance. Future studies should incorporate objective archival measures of green communication activities (e.g., sustainability report publication records, ISO 14001 certification status) alongside perceptual measures.

Future research avenues should include: geographically expanded probabilistic sampling designs; experimental or quasi-experimental designs to establish causal mechanisms with greater precision; and the incorporation of individual-level entrepreneurial personality variables and meso-level sector characteristics as potential moderators or boundary conditions of the theoretical model.

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